Further Mathematics - Degree in Engineering - 2024/2025
01-Multivariate Functions-Training hand exam for for serial number: 1

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3y - 3y^3}{2x^4 + 2x^2y - 2x^2y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 16

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −44

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 4y^3$ defined over the domain $D \equiv 6x^2 + 6y^2 \leq 102$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.6****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 2

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^4 - x y^2 + y^4}{3 x^2 y - 3 x^3 y + 3 x^2 y^2 + y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 48

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5 x^3 - 3 y^3$ defined over the domain $D \equiv 45 x^2 + 18 y^2 \leqslant 1908$, compute its absolute maxima and minima.

1) The value of the maximum is ****.9****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.6****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 3

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -50

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -25

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 + y^3$ defined over the domain $D \equiv 9x^2 + 3y^2 \leq 48$, compute its absolute maxima and minima.

1) The value of the minimum is ****.8****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.9****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 4

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^5 - x^4 y + y^4}{3x^2 y^2 + 3x y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 31

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 21

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -x^3 - y^3$ defined over the domain $D \equiv 6x^2 + 3y^2 \leq 108$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.0****

3) The value of the maximum is ****.5****

4) The value of the maximum is ****.8****

5) The value of the maximum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 5

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^4+2y^4}{-4x-2x^2+x^4+4x^5+4x^6+2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 31

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −22

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3+2y^3$ defined over the domain $D\equiv 3x^2+9y^2\leq 84$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.3****

3) The value of the maximum is ****.8****

4) The value of the maximum is ****.1****

5) The value of the maximum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 6

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^4+3y^4}{-6x-3x^2+x^4+6x^5+3x^6+3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 46

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −24

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-x^3+5y^3$ defined over the domain $D\equiv 3x^2+15y^2\leqslant 72$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.6****

5) The value of the maximum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 7

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{2xy}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -33

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 2y^3$ defined over the domain $D \equiv 3x^2 + 15y^2 \leqslant 378$, compute its absolute maxima and minima.

1) The value of the minimum is ****. 2 ****

2) The value of the minimum is ****. 6 ****

3) The value of the minimum is ****. 1 ****

4) The value of the minimum is ****. 4 ****

5) The value of the minimum is ****. 3 ****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 8

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{3x}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -36

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -48

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 - 4y^3$ defined over the domain $D \equiv 45x^2 + 6y^2 \leqslant 1626$, compute its absolute maxima and minima.

1) The value of the minimum is ****.5****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 9

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3 - x^2 y - 2y^2}{x y + 3x^2 y + 3x y^2 + 3y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -14

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 47

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 + y^3$ defined over the domain $D \equiv 24x^2 + 9y^2 \leqslant 708$, compute its absolute maxima and minima.

1) The value of the maximum is $****.4****$

2) The value of the maximum is $****.1****$

3) The value of the maximum is $****.7****$

4) The value of the maximum is $****.6****$

5) The value of the maximum is $****.9****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 10

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -2x + \frac{-2y^2 - 3y^3}{x^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -29

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -15

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 + 5y^3$ defined over the domain $D \equiv 30x^2 + 45y^2 \leqslant 2100$, compute its absolute maxima and minima.

1) The value of the minimum is ****.6****

2) The value of the minimum is ****.9****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 11

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4y + 3y^4 - 2xy^4 - 2y^5}{x^4 - 3xy^4 + 3y^5}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 41

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 3

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 + 4y^3$ defined over the domain $D \equiv 12x^2 + 24y^2 \leqslant 576$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.1****

3) The value of the minimum is ****.5****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 12

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^4 + x^3y^2 + 2y^5}{x^5 - 2x^3y - x^3y^2 + 3y^5}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 48

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −42

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 + 2y^3$ defined over the domain $D \equiv 15x^2 + 12y^2 \leqslant 252$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.6****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 13

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^5 - 2x^3y - x^2y^3}{2x^5 - 2y^4 + xy^4 + y^5}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 11

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 15x^2 + 18y^2 \leqslant 663$, compute its absolute maxima and minima.

1) The value of the minimum is ****.1****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.9****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 14

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^2y^2 - 2y^3 + 5xy^3}{x^4 - 2x^2y + 3xy^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -26

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -25

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 + 5y^3$ defined over the domain $D \equiv 27x^2 + 30y^2 \leqslant 1452$, compute its absolute maxima and minima.

1) The value of the maximum is ****.2****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 15

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3xy}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -9

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 39

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 + 4y^3$ defined over the domain $D \equiv 12x^2 + 18y^2 \leqslant 210$, compute its absolute maxima and minima.

1) The value of the minimum is ****.7****

2) The value of the minimum is ****.2****

3) The value of the minimum is ****.0****

4) The value of the minimum is ****.6****

5) The value of the minimum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 16

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^5 + 2x^3y - 2x^4y + y^5}{x^4 + 3x^5 - 3x^2y^3 + y^5}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 29

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 + 4y^3$ defined over the domain $D \equiv 6x^2 + 24y^2 \leqslant 408$, compute its absolute maxima and minima.

1) The value of the minimum is ****.8****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.6****

4) The value of the minimum is ****.7****

5) The value of the minimum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 17

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4 - 2y^4}{6x + 4x^2 + x^4 + 2x^5 - 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -160

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 252

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 - 2y^3$ defined over the domain $D \equiv 15x^2 + 3y^2 \leqslant 63$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.2****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 18

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^4 + 2x^2y + y^4}{3x^4 + 3x^3y + 2xy^2 - 3x^2y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 41

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −22

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 + 4y^3$ defined over the domain $D \equiv 45x^2 + 18y^2 \leqslant 1782$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.1****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.8****

5) The value of the maximum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 19

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^4+3y^4}{-6x-3x^2+x^4-6x^5+3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 46

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −75

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3+2y^3$ defined over the domain $D\equiv 3x^2+15y^2\leqslant 378$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.7****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 20

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - 2y^4}{-2x - 3x^2 + x^4 - 2x^5 + y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -29

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -39

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 5y^3$ defined over the domain $D \equiv 3x^2 + 30y^2 \leq 492$, compute its absolute maxima and minima.

1) The value of the maximum is ****.5****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.7****

4) The value of the maximum is ****.9****

5) The value of the maximum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 21

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{y^5}{\left(x^2+y^2\right)^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 9

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 - 2y^3$ defined over the domain $D \equiv 24x^2 + 12y^2 \leqslant 576$, compute its absolute maxima and minima.

1) The value of the minimum is ****.1****

2) The value of the minimum is ****.0****

3) The value of the minimum is ****.4****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 22

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^4 - y^4}{-6x - 6x^2 + x^4 + 6x^5 + 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 3

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −15

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 2y^3$ defined over the domain $D \equiv 3x^2 + 9y^2 \leq 93$, compute its absolute maxima and minima.

1) The value of the maximum is ****.2****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.6****

4) The value of the maximum is ****.8****

5) The value of the maximum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 23

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^3 - 3y^3}{-4x - 4x^2 + x^3 + 2x^4 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -58

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -26

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -2x^3 - 2y^3$ defined over the domain $D \equiv 6x^2 + 9y^2 \leq 105$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.4****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.3****

5) The value of the maximum is ****.9****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 24

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{x}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -22

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -4x^3 - y^3$ defined over the domain $D\equiv 24x^2 + 9y^2 \leqslant 708$, compute its absolute maxima and minima.

1) The value of the minimum is $****.7****$

2) The value of the minimum is $****.4****$

3) The value of the minimum is $****.6****$

4) The value of the minimum is $****.1****$

5) The value of the minimum is $****.8****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 25

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3\,y^3}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 44

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −43

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3\,x^3 + y^3$ defined over the domain $D \equiv 27\,x^2 + 9\,y^2 \leqslant 1296$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.9****

3) The value of the maximum is ****.8****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 26

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^3}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -5

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 6

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3x^3 + y^3$ defined over the domain $D \equiv 18x^2 + 6y^2 \leqslant 384$, compute its absolute maxima and minima.

1) The value of the maximum is ****.3****

2) The value of the maximum is ****.7****

3) The value of the maximum is ****.6****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 27

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^2 y - 3 x y^2 + 2 y^3}{\left(x^2 + y^2\right)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -1

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 26

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3 x^3 + 2 y^3$ defined over the domain $D \equiv 27 x^2 + 12 y^2 \leqslant 1164$, compute its absolute maxima and minima.

1) The value of the minimum is ****.6****

2) The value of the minimum is ****.0****

3) The value of the minimum is ****.5****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 28

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - 3y^4}{3x + 3x^2 + x^4 + 2x^5 - x^6 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -240

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 345

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 15x^2 + 27y^2 \leqslant 1347$, compute its absolute maxima and minima.

1) The value of the minimum is $****.1****$

2) The value of the minimum is $****.5****$

3) The value of the minimum is $****.6****$

4) The value of the minimum is $****.8****$

5) The value of the minimum is $****.9****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 29

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^3 - y^3}{2x + x^2 + x^3 + 2x^4 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -10

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -30

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -x^3 - 2y^3$ defined over the domain $D \equiv 9x^2 + 12y^2 \leqslant 516$, compute its absolute maxima and minima.

1) The value of the minimum is ****.0****

2) The value of the minimum is ****.9****

3) The value of the minimum is ****.7****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 30

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^3+3y^3}{-6x-6x^2+x^3+3x^4-3x^5+3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 41

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 22

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3+y^3$ defined over the domain $D\equiv 3x^2+3y^2\leq 15$, compute its absolute maxima and minima.

1) The value of the maximum is ****.5****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.9****

4) The value of the maximum is ****.6****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 31

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^3 - y^3}{2x + 4x^2 + x^3 - 4x^4 + 2x^5 - 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 1

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 4y^3$ defined over the domain $D \equiv 6x^2 + 12y^2 \leqslant 144$, compute its absolute maxima and minima.

1) The value of the minimum is ****.2****

2) The value of the minimum is ****.6****

3) The value of the minimum is ****.9****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 32

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x\,y}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -31

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -18

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3\,x^3 + 3\,y^3$ defined over the domain $D\equiv 18\,x^2 + 27\,y^2 \leqslant 1260$, compute its absolute maxima and minima.

1) The value of the minimum is ****.9****

2) The value of the minimum is ****.0****

3) The value of the minimum is ****.8****

4) The value of the minimum is ****.3****

5) The value of the minimum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 33

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^4 + 2x^2y - 3x^2y^2 - 3y^4}{x^4 - 3xy^2 - xy^3 - 2y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -6

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 40

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 - 3y^3$ defined over the domain $D \equiv 18x^2 + 9y^2 \leqslant 198$, compute its absolute maxima and minima.

1) The value of the maximum is ****.5****

2) The value of the maximum is ****.6****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.7****

5) The value of the maximum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 34

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 + 2y^3}{-6x - 4x^2 + x^3 + 4x^4 + 4x^5 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 73

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 55

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 + y^3$ defined over the domain $D \equiv 6x^2 + 6y^2 \leq 192$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.3****

3) The value of the maximum is ****.5****

4) The value of the maximum is ****.8****

5) The value of the maximum is ****.9****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 35

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^2+3x^3+x^2y-xy^2}{-y^2+2xy^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 30

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −14

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-3x^3-3y^3$ defined over the domain $D\equiv 18x^2+18y^2\leqslant 576$, compute its absolute maxima and minima.

1) The value of the maximum is ****.1****

2) The value of the maximum is ****.9****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 36

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - 2y^4}{-2x - 4x^2 + x^4 - 2x^5 - 2x^6 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 1

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −10

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 6x^2 + 18y^2 \leqslant 312$, compute its absolute maxima and minima.

1) The value of the maximum is ****.1****

2) The value of the maximum is ****.9****

3) The value of the maximum is ****.7****

4) The value of the maximum is ****.6****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 37

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^3 - 3xy - 3x^2y - xy^2}{x^2 + 6x^2y - y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 30

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 32

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3x^3 - 3y^3$ defined over the domain $D \equiv 27x^2 + 18y^2 \leqslant 1260$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.3****

3) The value of the maximum is ****.9****

4) The value of the maximum is ****.2****

5) The value of the maximum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 38

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^4 - 3y^4}{3x + 2x^2 + x^4 + x^5 - x^6 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -245

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -272

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -2x^3 - 2y^3$ defined over the domain $D \equiv 9x^2 + 15y^2 \leqslant 456$, compute its absolute maxima and minima.

1) The value of the minimum is ****.5****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 39

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4+2y^4}{2x+4x^2+x^4-4x^5-2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -8

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3+5y^3$ defined over the domain $D\equiv 12x^2+15y^2\leqslant 252$, compute its absolute maxima and minima.

1) The value of the minimum is ****.2****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.7****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 40

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 - y^3}{6x + 9x^2 + x^3 - 3x^4 - 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -21

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -7

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - y^3$ defined over the domain $D \equiv 6x^2 + 9y^2 \leq 348$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.6****

3) The value of the minimum is ****.8****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 41

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^2y - 3y^3}{(x^2+y^2)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -45

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -42

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 - y^3$ defined over the domain $D \equiv 27x^2 + 9y^2 \leqslant 1296$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.4****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 42

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2xy^2 - xy^3 + y^4}{-3x^3 + x^4 + 3x^2y^2 - y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 34

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 50

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 - 3y^3$ defined over the domain $D \equiv 27x^2 + 27y^2 \leqslant 1944$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.9****

4) The value of the maximum is ****.4****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 43

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^3 - y^3}{\left(x^2 + y^2\right)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 7

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 17

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 - 2y^3$ defined over the domain $D \equiv 27x^2 + 3y^2 \leqslant 975$, compute its absolute maxima and minima.

1) The value of the minimum is ****.1****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 44

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^4 - 2y^4}{-6x - 6x^2 + x^4 + 4x^5 - 2x^6 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -161

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 104

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 5y^3$ defined over the domain $D \equiv 9x^2 + 45y^2 \leq 1944$, compute its absolute maxima and minima.

1) The value of the maximum is $****.2****$

2) The value of the maximum is $****.5****$

3) The value of the maximum is $****.1****$

4) The value of the maximum is $****.3****$

5) The value of the maximum is $****.7****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 45

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^3+3y^3}{3x+x^2+x^3+2x^4+2x^5-y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -32

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 84

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=x^3+4y^3$ defined over the domain $D\equiv 9x^2+18y^2\leqslant 486$, compute its absolute maxima and minima.

1) The value of the minimum is ****.0****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.7****

4) The value of the minimum is ****.1****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 46

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^3y - y^4}{(x^2+y^2)^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -32

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -11

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -4x^3 - y^3$ defined over the domain $D \equiv 12x^2 + 3y^2 \leqslant 60$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.1****

4) The value of the maximum is ****.3****

5) The value of the maximum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 47

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^4+2y^4}{3x+x^2+x^4+x^5-y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 161

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −307

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-3x^3+5y^3$ defined over the domain $D\equiv 27x^2+15y^2\leqslant 1032$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 48

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3\,x\,y^2 + 2\,x\,y^3 - 3\,y^4}{x^4 + 2\,x^2\,y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -32

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -21

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5\,x^3 - 4\,y^3$ defined over the domain $D \equiv 45\,x^2 + 30\,y^2 \leqslant 2370$, compute its absolute maxima and minima.

1) The value of the maximum is ****.9****

2) The value of the maximum is ****.7****

3) The value of the maximum is ****.8****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 49

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^3 + xy^3 - 2y^4}{3x^4 - x^2y^2 - 2y^3 + 2xy^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 15

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −33

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -4x^3 + 2y^3$ defined over the domain $D \equiv 6x^2 + 3y^2 \leq 9$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.4****

4) The value of the maximum is ****.1****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 50

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^2 - 2y^3}{x^2 y - y^2 + 2y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 43

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −50

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - y^3$ defined over the domain $D \equiv 6x^2 + 6y^2 \leq 192$, compute its absolute maxima and minima.

1) The value of the minimum is ****.6****

2) The value of the minimum is ****.0****

3) The value of the minimum is ****.4****

4) The value of the minimum is ****.1****

5) The value of the minimum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 51

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4+y^4}{-x-2x^2+x^4+x^5+x^6+y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 15

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 3

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+4y^3$ defined over the domain $D\equiv 12x^2+30y^2\leqslant 942$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.0****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.4****

5) The value of the maximum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 52

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3+y^3}{-6x-3x^2+x^3-3x^4+3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 14

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 5

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3+3y^3$ defined over the domain $D\equiv 6x^2+9y^2\leq 60$, compute its absolute maxima and minima.

1) The value of the maximum is ****.2****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.1****

4) The value of the maximum is ****.9****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 53

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^2+xy}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -37

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 5

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+2y^3$ defined over the domain $D\equiv 15x^2+15y^2\leqslant 750$, compute its absolute maxima and minima.

1) The value of the maximum is $****.8****$

2) The value of the maximum is $****.7****$

3) The value of the maximum is $****.9****$

4) The value of the maximum is $****.1****$

5) The value of the maximum is $****.3****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 54

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - y^4}{-6x - 2x^2 + x^4 - 2x^5 + 4x^6 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -78

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -147

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 2y^3$ defined over the domain $D \equiv 6x^2 + 6y^2 \leq 120$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.1****

4) The value of the maximum is ****.4****

5) The value of the maximum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 55

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 + x^3 y + 3x y^2 + y^4}{-3x^2 y + 3x^2 y^2 + 2y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 3

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −28

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -x^3 + 4y^3$ defined over the domain $D \equiv 6x^2 + 18y^2 \leq 258$, compute its absolute maxima and minima.

1) The value of the maximum is ****.7****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.4****

4) The value of the maximum is ****.9****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 56

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4y + 2x^3y^2 + y^4 + 3y^5}{3x^5 - x^3y - 3x^3y^2 + xy^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 44

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −14

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 + 5y^3$ defined over the domain $D \equiv 45x^2 + 30y^2 \leqslant 2100$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.0****

4) The value of the maximum is ****.3****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 57

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^4+3xy^2+3x^2y^2+3xy^3}{x^3+3x^2y^2+2y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -47

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 0

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-2x^3-5y^3$ defined over the domain $D\equiv 15x^2+15y^2\leqslant 435$, compute its absolute maxima and minima.

1) The value of the minimum is ****.3****

2) The value of the minimum is ****.7****

3) The value of the minimum is ****.8****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 58

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^2+3x^3-2xy^2-3y^3}{2x^3+3xy+3xy^2+y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 31

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 35

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-3x^3-4y^3$ defined over the domain $D\equiv 18x^2+6y^2\leqslant 294$, compute its absolute maxima and minima.

1) The value of the minimum is ****.7****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.5****

4) The value of the minimum is ****.4****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 59

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^2 + 3x^3 + x^2 y + 2xy^2}{-3x^2 y + 2y^2 + 2y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -23

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -22

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 + 4y^3$ defined over the domain $D \equiv 45x^2 + 6y^2 \leqslant 1626$, compute its absolute maxima and minima.

1) The value of the minimum is ****.3****

2) The value of the minimum is ****.7****

3) The value of the minimum is ****.9****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 60

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{x}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 25

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -2x^3 - 4y^3$ defined over the domain $D\equiv 6x^2 + 24y^2 \leqslant 408$, compute its absolute maxima and minima.

1) The value of the minimum is ****.0****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 61

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - x^3 y + 2y^3 - 2xy^3}{2x^2 y - x^3 y + 2x^2 y^2 + y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 21

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 - 5y^3$ defined over the domain $D \equiv 30x^2 + 30y^2 \leqslant 960$, compute its absolute maxima and minima.

1) The value of the maximum is ****.5****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.8****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 62

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{6x^3y+y^3}{-3x^4-3x^2y+x^2y^2+xy^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -37

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -26

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=5x^3-4y^3$ defined over the domain $D\equiv 15x^2+6y^2\leqslant 66$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.8****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 63

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 - 2y^3}{-6x - 6x^2 + x^3 + 6x^4 + 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -15

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -31

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 12x^2 + 9y^2 \leqslant 228$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.8****

4) The value of the maximum is ****.9****

5) The value of the maximum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 64

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^3+3y^3}{2x+3x^2+x^3+x^4-x^5-y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -37

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+5y^3$ defined over the domain $D\equiv 9x^2+15y^2\leqslant 141$, compute its absolute maxima and minima.

1) The value of the minimum is $****.9****$

2) The value of the minimum is $****.0****$

3) The value of the minimum is $****.1****$

4) The value of the minimum is $****.7****$

5) The value of the minimum is $****.5****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 65

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2\,x\,y^3 - 3\,y^4}{\left(x^2+y^2\right)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -14

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -24

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3\,x^3 - 4\,y^3$ defined over the domain $D\equiv 18\,x^2 + 12\,y^2 \leqslant 336$, compute its absolute maxima and minima.

1) The value of the minimum is ****.2****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.9****

4) The value of the minimum is ****.6****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 66

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2xy+5xy^2}{x^3+3x^2y+3y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 13

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 1

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=5x^3+4y^3$ defined over the domain $D\equiv 30x^2+6y^2\leqslant 486$, compute its absolute maxima and minima.

1) The value of the maximum is ****.3****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.5****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 67

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{x^3 y^2}{\left(x^2+y^2\right)^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -47

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -17

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3x^3 - 5y^3$ defined over the domain $D\equiv 9x^2+45y^2 \leqslant 1656$, compute its absolute maxima and minima.

1) The value of the minimum is $****.8****$

2) The value of the minimum is $****.1****$

3) The value of the minimum is $****.6****$

4) The value of the minimum is $****.0****$

5) The value of the minimum is $****.7****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 68

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^2y^2 + xy^3}{(x^2+y^2)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -22

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -17

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3x^3 + 5y^3$ defined over the domain $D \equiv 9x^2 + 45y^2 \leqslant 1656$, compute its absolute maxima and minima.

1) The value of the maximum is $****.8****$

2) The value of the maximum is $****.6****$

3) The value of the maximum is $****.2****$

4) The value of the maximum is $****.1****$

5) The value of the maximum is $****.9****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 69

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^3+3xy^2}{(x^2+y^2)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 33

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −13

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3+5y^3$ defined over the domain $D\equiv 45x^2+30y^2 \leqslant 2100$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.1****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.2****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 70

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^3 - y^3}{3x + 3x^2 + x^3 - x^4 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -24

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -20

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 3y^3$ defined over the domain $D \equiv 3x^2 + 9y^2 \leq 48$, compute its absolute maxima and minima.

1) The value of the minimum is ****.9****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.1****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 71

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - x^2 y - 3x^3 y + y^4}{-3x^3 + 3x^3 y + x y^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 36

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 5

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 - 4y^3$ defined over the domain $D \equiv 30x^2 + 24y^2 \leqslant 1134$, compute its absolute maxima and minima.

1) The value of the minimum is ****.8****

2) The value of the minimum is ****.5****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.6****

5) The value of the minimum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 72

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{4x^3y + 2y^3 - 2xy^3}{x^3 + 2x^4 + 3xy^3 + y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 23

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 45

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 + 5y^3$ defined over the domain $D \equiv 30x^2 + 45y^2 \leqslant 2370$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.4****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 73

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 + 2\,y^3}{4\,x + 6\,x^2 + x^3 - 4\,x^4 - 4\,x^5 - 2\,y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 17

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 15

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 + 2\,y^3$ defined over the domain $D \equiv 9\,x^2 + 6\,y^2 \leqslant 348$, compute its absolute maxima and minima.

1) The value of the minimum is ****.6****

2) The value of the minimum is ****.9****

3) The value of the minimum is ****.3****

4) The value of the minimum is ****.7****

5) The value of the minimum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 74

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^3+2y^3}{2x+4x^2+x^3-4x^4-2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 6

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+y^3$ defined over the domain $D\equiv 12x^2+6y^2\leqslant 288$, compute its absolute maxima and minima.

1) The value of the minimum is ****.9****

2) The value of the minimum is ****.6****

3) The value of the minimum is ****.2****

4) The value of the minimum is ****.7****

5) The value of the minimum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 75

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4+2y^4}{-2x-4x^2+x^4-2x^5+2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 19

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 5

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=3x^3+y^3$ defined over the domain $D\equiv 27x^2+3y^2\leqslant 984$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.3****

3) The value of the maximum is ****.1****

4) The value of the maximum is ****.4****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 76

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^4 - 2y^4}{9x + 9x^2 + x^4 + 3x^5 - 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 181

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −163

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -2x^3 - 3y^3$ defined over the domain $D \equiv 15x^2 + 18y^2 \leqslant 663$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.0****

3) The value of the minimum is ****.2****

4) The value of the minimum is ****.1****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 77

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^4+y^4}{2x+6x^2+x^4-2x^5+4x^6-2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 2

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −10

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+2y^3$ defined over the domain $D\equiv 12x^2+6y^2\leqslant 216$, compute its absolute maxima and minima.

1) The value of the minimum is ****.2****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 78

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^2+3xy}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 50

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 9

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -4x^3+5y^3$ defined over the domain $D\equiv 30x^2+30y^2 \leqslant 1230$, compute its absolute maxima and minima.

1) The value of the minimum is ****.3****

2) The value of the minimum is ****.1****

3) The value of the minimum is ****.6****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 79

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^3+x^2y}{(x^2+y^2)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -7

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 30

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-3x^3+4y^3$ defined over the domain $D\equiv 27x^2+30y^2\leqslant 1722$, compute its absolute maxima and minima.

1) The value of the minimum is $****.3****$

2) The value of the minimum is $****.1****$

3) The value of the minimum is $****.5****$

4) The value of the minimum is $****.8****$

5) The value of the minimum is $****.2****$

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 80

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{x^3}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -5

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -1

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 - 3y^3$ defined over the domain $D \equiv 45x^2 + 18y^2 \leqslant 1908$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.5****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 81

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 - y^3}{6x + 9x^2 + x^3 + 6x^4 - 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -7

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 8

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 15x^2 + 27y^2 \leqslant 1347$, compute its absolute maxima and minima.

1) The value of the minimum is ****.1****

2) The value of the minimum is ****.9****

3) The value of the minimum is ****.2****

4) The value of the minimum is ****.4****

5) The value of the minimum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 82

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3 - 3y^3}{-2x - x^2 + x^3 - 2x^4 + y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 11

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -2x^3 + 4y^3$ defined over the domain $D \equiv 6x^2 + 18y^2 \leq 186$, compute its absolute maxima and minima.

1) The value of the minimum is ****.0****

2) The value of the minimum is ****.9****

3) The value of the minimum is ****.2****

4) The value of the minimum is ****.5****

5) The value of the minimum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 83

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4+2y^4}{3x+9x^2+x^4+3x^5-6x^6-3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 16

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=2x^3+5y^3$ defined over the domain $D\equiv 6x^2+30y^2\leqslant 504$, compute its absolute maxima and minima.

1) The value of the minimum is ****.3****

2) The value of the minimum is ****.8****

3) The value of the minimum is ****.7****

4) The value of the minimum is ****.9****

5) The value of the minimum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 84

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - 2y^4}{3x + x^2 + x^4 - 2x^5 - x^6 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 290

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −159

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 - 3y^3$ defined over the domain $D \equiv 30x^2 + 9y^2 \leqslant 516$, compute its absolute maxima and minima.

1) The value of the minimum is ****.2****

2) The value of the minimum is ****.7****

3) The value of the minimum is ****.5****

4) The value of the minimum is ****.3****

5) The value of the minimum is ****.9****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 85

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^2+3xy-3y^2}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 41

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 49

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-4x^3-5y^3$ defined over the domain $D\equiv 6x^2+30y^2\leqslant 486$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.9****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.0****

5) The value of the maximum is ****.2****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 86

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3x^4 - x^2y^2 - y^3}{x^4 + x^3y + 3xy^2 + xy^3}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 50

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 + 2y^3$ defined over the domain $D \equiv 3x^2 + 9y^2 \leq 84$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.3****

3) The value of the maximum is ****.4****

4) The value of the maximum is ****.1****

5) The value of the maximum is ****.6****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 87

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^4 - 2y^4}{x + 3x^2 + x^4 + x^5 + x^6 - y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -5

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -8

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -x^3 - 4y^3$ defined over the domain $D \equiv 9x^2 + 30y^2 \leqslant 1074$, compute its absolute maxima and minima.

1) The value of the minimum is ****.3****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.6****

4) The value of the minimum is ****.5****

5) The value of the minimum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 88

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{x^3 - 2y^3}{-6x - 4x^2 + x^3 + 4x^4 + 2y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -53

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -12

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 2x^3 - 3y^3$ defined over the domain $D \equiv 3x^2 + 9y^2 \leqslant 39$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.7****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.1****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 89

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x^4 + 2x^2y^2 + xy^3}{\left(x^2+y^2\right)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 47

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −25

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 + 4y^3$ defined over the domain $D \equiv 45x^2 + 6y^2 \leqslant 1626$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.1****

3) The value of the maximum is ****.2****

4) The value of the maximum is ****.4****

5) The value of the maximum is ****.9****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 90

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} -\frac{2x^2 y}{\left(x^2+y^2\right)^{3/2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 9

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 - 4y^3$ defined over the domain $D\equiv 27x^2 + 24y^2 \leqslant 1356$, compute its absolute maxima and minima.

1) The value of the maximum is ****.6****

2) The value of the maximum is ****.8****

3) The value of the maximum is ****.5****

4) The value of the maximum is ****.1****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 91

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{3y^2}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 2

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 20

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 + 5y^3$ defined over the domain $D \equiv 27x^2 + 15y^2 \leqslant 1032$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.9****

3) The value of the maximum is ****.3****

4) The value of the maximum is ****.7****

5) The value of the maximum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 92

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-x-3y}{\sqrt{x^2+y^2}}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 23

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −23

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -4x^3 - 2y^3$ defined over the domain $D \equiv 12x^2 + 6y^2 \leqslant 72$, compute its absolute maxima and minima.

1) The value of the minimum is ****.4****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 93

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^5 + 3x^3y^2 + 2y^4}{-3x^3y + 3x^4y + 2x^3y^2 + 3xy^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 11

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −42

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -5x^3 + 2y^3$ defined over the domain $D \equiv 15x^2 + 6y^2 \leqslant 84$, compute its absolute maxima and minima.

1) The value of the maximum is ****.8****

2) The value of the maximum is ****.1****

3) The value of the maximum is ****.9****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.7****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 94

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-2x^2-2y^2}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -7

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -27

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-3x^3-5y^3$ defined over the domain $D\equiv 27x^2+45y^2\leqslant 2592$, compute its absolute maxima and minima.

1) The value of the minimum is ****.8****

2) The value of the minimum is ****.5****

3) The value of the minimum is ****.6****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.0****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 95

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4 - 3x^3y - 3xy^2 - 3x^2y^2}{x^3 + 3x^3y - 3y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -25

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 5x^3 + 2y^3$ defined over the domain $D \equiv 45x^2 + 9y^2 \leqslant 1701$, compute its absolute maxima and minima.

1) The value of the minimum is ****.7****

2) The value of the minimum is ****.6****

3) The value of the minimum is ****.1****

4) The value of the minimum is ****.0****

5) The value of the minimum is ****.8****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 96

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3y^2 + x^2y^3 + 3y^5}{(x^2+y^2)^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 18

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −23

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 4x^3 + 2y^3$ defined over the domain $D \equiv 12x^2 + 6y^2 \leqslant 72$, compute its absolute maxima and minima.

1) The value of the maximum is ****.0****

2) The value of the maximum is ****.2****

3) The value of the maximum is ****.1****

4) The value of the maximum is ****.5****

5) The value of the maximum is ****.9****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 97

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^3y + 3xy^2 + y^4}{2x^3 + 3x^2y^2 + y^4}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 20

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 36

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = 3x^3 - 4y^3$ defined over the domain $D \equiv 18x^2 + 6y^2 \leqslant 294$, compute its absolute maxima and minima.

1) The value of the maximum is ****.4****

2) The value of the maximum is ****.7****

3) The value of the maximum is ****.0****

4) The value of the maximum is ****.3****

5) The value of the maximum is ****.5****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 98

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^4 - 2y^4}{-6x - 3x^2 + x^4 - 3x^5 + 3y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 59

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to −30

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = x^3 - 3y^3$ defined over the domain $D \equiv 6x^2 + 9y^2 \leq 132$, compute its absolute maxima and minima.

1) The value of the maximum is ****.1****

2) The value of the maximum is ****.5****

3) The value of the maximum is ****.7****

4) The value of the maximum is ****.3****

5) The value of the maximum is ****.4****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 99

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{-3x^3+y^3}{x+3x^2+x^3+x^4-2x^5-y}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -2

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 2

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y)=-x^3+3y^3$ defined over the domain $D\equiv 6x^2+9y^2\leq 132$, compute its absolute maxima and minima.

1) The value of the minimum is ****.5****

2) The value of the minimum is ****.4****

3) The value of the minimum is ****.6****

4) The value of the minimum is ****.2****

5) The value of the minimum is ****.3****

Further Mathematics - Degree in Engineering - 2024/2025 01-Multivariate Functions-Training hand exam for for serial number: 100

Exercise 1

Study the limit, $\lim_{(x,y)\to(0,0)} \frac{2x^2}{x^2+y^2}$.

1) The limit exists.

2) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to -46

3) For any line passing through the point we obtain the same limit but there is a parabolic curve along which we obtain different limit equal to 4

4) We obtain different limit for different lines passing through the point.

Exercise 2

Given the function

$f(x,y) = -3x^3 + y^3$ defined over the domain $D \equiv 27x^2 + 3y^2 \leq 984$, compute its absolute maxima and minima.

1) The value of the minimum is ****.7****

2) The value of the minimum is ****.3****

3) The value of the minimum is ****.5****

4) The value of the minimum is ****.8****

5) The value of the minimum is ****.4****