

Further Mathematics - Degree in Engineering - 2026/2027

01-Multivariate Functions-Training hand exam for serial number: 1

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{3y^2 + 4y^4 + 2y^2 \operatorname{Log}[1 + 3x^2]}{6x^2 - 2x^3 + 4y^2}$.

- 1) The limit is 0.
- 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 -40
- 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 -41
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -3
- 6) The limit is 1

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01-Multivariate Functions-Training hand exam for serial number: 2

Exercise 1

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

- 1) The limit is 0.
- 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 -33
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 3

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)}$

$$\frac{2y^2 - 12x^2y^2 - 8y^4 + \text{Log}[1 + 3x^2] - 6x^2 \text{Log}[1 + 3x^2] - 4y^2 \text{Log}[1 + 3x^2]}{-3x^2 - 2y^2}.$$

- 1) The limit is 0.
- 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 -46
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 4

Exercise 1

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

- 1) The limit is 0.
- 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 23
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 3
- 6) The limit is -1

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01-Multivariate Functions-Training hand exam for serial number: 5

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)}$

$$\frac{-2 - 6x^2 - 4x^4 - 6y^2 - 6x^2y^2 + 2\cos[\sqrt{3}y] + 4x^2\cos[\sqrt{3}y] + 6y^2\cos[\sqrt{3}y]}{-2x^2 - 3y^2}.$$

- 1) The limit is 0.
- 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 7
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 6

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-2y^2 + 2x^2y^2 + 2y^2 \sin[2y^2]}{x^2 + 2y^2}$.

- 1) The limit is 0.
- 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 49
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 7

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{3 \operatorname{Log} [1 + 2 x^2 + y^2] - 4 x^2 \operatorname{Log} [1 + 2 x^2 + y^2] - 2 y^2 \operatorname{Log} [1 + 2 x^2 + y^2]}{-2 x^2 - y^2 + 2 y^3} .$

- 1) The limit is 0.
- 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 -50
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 8

Exercise 1

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

- 1) The limit is 0.
- 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 12
- 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.
- 5) The limit is -3
- 6) The limit is 2

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01-Multivariate Functions-Training hand exam for serial number: 9

Exercise 1

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

- 1) The limit is 0.
- 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 -12
- 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.
- 5) The limit is 2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 10

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-6x^2 + 8x^4 + 12x^2y^2 - 3\sin[3y^2] + 4x^2\sin[3y^2] + 6y^2\sin[3y^2]}{-2x^2 - 3y^2}$.

- 1) The limit is 0.
- 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.
- 5) The limit is 1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 11

Exercise 1

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

- 1) The limit is 0.
- 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 -49
- 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.
- 5) The limit is 1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 12

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{1 - e^{x^2} - x^2 + e^{x^2} x^2 - 2y^2 + 2e^{x^2} y^2}{x^2 + 2y^2}$.

- 1) The limit is 0.
- 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 -27
- 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.
- 5) The limit is -2
- 6) The limit is -1

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01-Multivariate Functions-Training hand exam for serial number: 13

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2 + x^4 + x^2 \operatorname{Log}[1 + 3y^2]}{-x^2 - 3y^2 + 3y^4}$.

- 1) The limit is 0.
- 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 -27
- 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.
- 5) The limit is 2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 14

Exercise 1

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

- 1) The limit is 0.
- 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 42
- 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 29
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 15

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-4x^2 - 12y^2 - 6x^2y^2 - 18y^4 + 4x^2 \cos[x] + 12y^2 \cos[x]}{-x^2 - 3y^2}$.

- 1) The limit is 0.
- 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 4
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 16

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-3x^2 + 2x^2 \operatorname{Log}[1 + 3x^2 + y^2]}{-6x^2 - x^3 - 2y^2}$.

- 1) The limit is 0.
- 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 28
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 17

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{1 - e^{2y^2} - 3x^2 + 2e^{2y^2}x^2 + 2x^4 - 4y^2 + 4e^{2y^2}y^2 + 4x^2y^2}{2x^2 + 4y^2}$.

- 1) The limit is 0.
- 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 -34
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is $-\frac{1}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 18

Exercise 1

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

- 1) The limit is 0.
- 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 34
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is 2

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01-Multivariate Functions-Training hand exam for serial number: 19

Exercise 1

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

- 1) The limit is 0.
- 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 -41
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 20

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-5y^2 - 4y^4 + 4y^2 \cos[\sqrt{3}x]}{3x^2 + 2y^2}$.

- 1) The limit is 0.
- 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 28
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is 2

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01-Multivariate Functions-Training hand exam for serial number: 21

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-5y^2 + 4y^2 \cos[\sqrt{2x^2 + y^2}]}{2x^2 + y^2 - y^3}$.

- 1) The limit is 0.
- 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 32
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 3
- 6) The limit is 2

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01-Multivariate Functions-Training hand exam for serial number: 22

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{1 - e^{3y^2} - 2x^2 + e^{3y^2}x^2 + x^4 - 3y^2 + 3e^{3y^2}y^2 + 3x^2y^2}{x^2 + 3y^2}$.

- 1) The limit is 0.
- 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 49
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 23

Exercise 1

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

- 1) The limit is 0.
- 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 -33
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 24

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{3y^2 - 2x^2y^2 - y^4 + 3\operatorname{Log}[1 + 2x^2] - 2x^2\operatorname{Log}[1 + 2x^2] - y^2\operatorname{Log}[1 + 2x^2]}{4x^2 + 2y^2}$.

- 1) The limit is 0.
- 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 49
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 3
- 6) The limit is $\frac{3}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 25

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{9x^2 + 9x^4 + 6x^2y^2 + 3\sin[2y^2] + 3x^2\sin[2y^2] + 2y^2\sin[2y^2]}{3x^2 + 2x^2y + 2y^2}.$

- 1) The limit is 0.
- 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 -49
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -3
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 26

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-4y^2 - 2x^2y^2 - 4y^4 - 2\operatorname{Log}[1+x^2] - x^2\operatorname{Log}[1+x^2] - 2y^2\operatorname{Log}[1+x^2]}{2x^2 + 4y^2}$.

- 1) The limit is 0.
- 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 -47
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 27

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2 + 4x^2y^2 + 2x^2 \sin[x^2]}{2x^2 + 4y^2}$.

- 1) The limit is 0.
- 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 -14
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 3
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 28

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)}$

$$\frac{6x^2 - 4x^4 - 6x^2y^2 + 3\operatorname{Log}[1 + 3y^2] - 2x^2\operatorname{Log}[1 + 3y^2] - 3y^2\operatorname{Log}[1 + 3y^2]}{2x^2 + 3y^2}.$$

- 1) The limit is 0.
- 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 -6
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 3
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 29

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-8x^2 - 8x^4 - 12y^2 - 12x^2y^2 + 8x^2 \cos[\sqrt{3}y] + 12y^2 \cos[\sqrt{3}y]}{2x^2 + 3y^2}$.

- 1) The limit is 0.
- 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 -7
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is 1

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01-Multivariate Functions-Training hand exam for serial number: 30

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-6 - 4x^2 - 21y^2 - 6x^2y^2 - 18y^4 + 6\cos[x] + 4x^2\cos[x] + 12y^2\cos[x]}{2x^2 + 6y^2 + 3xy^2}$.

- 1) The limit is 0.
- 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 12
- 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.
- 5) The limit is 1
- 6) The limit is $-\frac{3}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 31

Exercise 1

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

- 1) The limit is 0.
- 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 9
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is -1

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01-Multivariate Functions-Training hand exam for serial number: 32

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-3y^2 - y^4 - y^2 \operatorname{Log}[1 + 2x^2]}{-4x^2 + x^3 - 2y^2}$.

- 1) The limit is 0.
- 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 0
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 33

Exercise 1

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

- 1) The limit is 0.
- 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 18
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 2
- 6) The limit is -3

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01-Multivariate Functions-Training hand exam for serial number: 34

Exercise 1

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

- 1) The limit is 0.
- 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.
- 5) The limit is -1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 35

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)}$

$$\frac{6 - x^2 - 2x^4 - 12y^2 - 6x^2y^2 - 6\cos[\sqrt{3}y] + 4x^2\cos[\sqrt{3}y] + 12y^2\cos[\sqrt{3}y]}{-2x^2 - 6y^2}.$$

- 1) The limit is 0.
- 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.
- 5) The limit is 3
- 6) The limit is $-\frac{3}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 36

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{4x^2 + 12y^2 + 6x^2y^2 + 18y^4 - 4x^2 \cos[x] - 12y^2 \cos[x]}{-2x^2 - 6y^2}$.

- 1) The limit is 0.
- 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 28
- 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.
- 5) The limit is -2
- 6) The limit is -1

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01-Multivariate Functions-Training hand exam for serial number: 37

Exercise 1

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

- 1) The limit is 0.
- 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 -42
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 38

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)}$

$$\frac{-3y^2 + 2x^2y^2 + y^4 - 3\operatorname{Log}[1 + 2x^2] + 2x^2\operatorname{Log}[1 + 2x^2] + y^2\operatorname{Log}[1 + 2x^2]}{2x^2 + 2x^3y + y^2}.$$

- 1) The limit is 0.
- 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 -11
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is -3

Further Mathematics - Degree in Engineering - 2026/2027

01-Multivariate Functions-Training hand exam for serial number: 39

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-3x^2 - y^2 - 6x^2y^2 - 2y^4 - 6x^2 \sin[3x^2] - 2y^2 \sin[3x^2]}{-3x^2 - y^2}$.

- 1) The limit is 0.
- 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 -42
- 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.
- 5) The limit is 1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 40

Exercise 1

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

- 1) The limit is 0.
- 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 34
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 41

Exercise 1

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

- 1) The limit is 0.
- 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 49
- 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.
- 5) The limit is 2
- 6) The limit is -1

Further Mathematics - Degree in Engineering - 2026/2027

01-Multivariate Functions-Training hand exam for serial number: 42

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-y^2 + 2x^2y^2 + y^2 \operatorname{Log}[1 + 3y^2]}{4x^2 + 6y^2}$.

- 1) The limit is 0.
- 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 28
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -3
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial number: 43

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-1 + e^{x^2} - 2x^2 + 2e^{x^2}x^2 - 6y^2 + 6e^{x^2}y^2}{-x^2 - 3y^2 - y^4}$.

- 1) The limit is 0.
- 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 -2
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -1
- 6) The limit is -2

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01-Multivariate Functions-Training hand exam for serial number: 44

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{1 - e^{3x^2+2y^2} + 3x^2 - 3e^{3x^2+2y^2}x^2 + 2y^2 - 2e^{3x^2+2y^2}y^2}{-3x^2 - 2y^2 - xy^2}$.

- 1) The limit is 0.
- 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 4
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is 1

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01-Multivariate Functions-Training hand exam for serial number: 45

Exercise 1

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

- 1) The limit is 0.
- 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 27
- 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.
- 5) The limit is -3
- 6) The limit is 2

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01-Multivariate Functions-Training hand exam for serial number: 46

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-9y^2 + 6x^2y^2 + 18y^4 - 3\sin[x^2] + 2x^2\sin[x^2] + 6y^2\sin[x^2]}{2x^2 + 6y^2}$.

- 1) The limit is 0.
- 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 -40
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is $-\frac{3}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 47

Exercise 1

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

- 1) The limit is 0.
- 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 -42
- 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.
- 5) The limit is 2
- 6) The limit is 3

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01-Multivariate Functions-Training hand exam for serial
number: 48

Exercise 1

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

- 1) The limit is 0.
- 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 26
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is 1
- 6) The limit is -1

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Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-6x^2 - 3y^2 - 2x^2y^2 - y^4 + 4x^2 \cos[\sqrt{2}x] + 2y^2 \cos[\sqrt{2}x]}{4x^2 + 3x^3 + 2y^2}$.

- 1) The limit is 0.
- 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 -35
- 4) We obtain different limit for different lines passing through the point.
- 5) The limit is -2
- 6) The limit is $-\frac{1}{2}$

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01-Multivariate Functions-Training hand exam for serial number: 50

Exercise 1

Study the limit, $\lim_{(x,y) \rightarrow (0,0)} \frac{-4x^2 - 12y^2 - 6x^2y^2 - 18y^4 + 4x^2 \cos[x] + 12y^2 \cos[x]}{2x^2 + 2x^2y + 6y^2}$.

- 1) The limit is 0.
- 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 -42
- 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.
- 5) The limit is 3
- 6) The limit is -3