ONTARIO CALCULUS AND VECTORS, GRADE 12, UNIVERSITY PREPARATION (MCV4U) · FINAL EXAM · 50 QUESTIONS

Final Exam — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 The limit as x approaches 0 of $\sin \frac{4x}{x}$ is

- A 5
- B 1
- C 0
- D 4

Understand It with Pulse | Flag a mistake

2 The derivative of $f(x) = x^4$ at x equal to 1 is

- A 5
- B 3
- C 15
- D 4

Understand It with Pulse | Flag a mistake

3 **A vector has components (6, 8) Its magnitude is**

- A 11
- B 10
- C 9
- D 14

Understand It with Pulse | Flag a mistake

4 **The dot product of (2, 3) and (4, 1) is**

- A 11
- B 13
- C 9
- D 14

Understand It with Pulse | Flag a mistake

5 For $f(x) = x^2$ the average rate of change from x equal to 0 to x equal to 4 is

- **A** 5
- **B** 3
- **C** 4
- **D** 8

Understand It with Pulse | Flag a mistake

6 The derivative of $f(x) = 2x^2 + 3x$ is

- **A** $f'(x) = 4x + 3x$
- **B** $f'(x) = 2x$
- **C** $f'(x) = 2x^2 + 3$
- **D** $f'(x) = 4x + 3$

Understand It with Pulse | Flag a mistake

7 **A vector has components (6, 8) The unit vector in its direction has first component, as a fraction,**

- **A** $\frac{8}{10}$
- **B** $\frac{6}{10}$
- **C** $\frac{10}{6}$
- **D** $\frac{6}{8}$

Understand It with Pulse | Flag a mistake

8 **The dot product of (4, 3) with itself is**

- **A** 30
- **B** 7
- **C** 16
- **D** 25

Understand It with Pulse | Flag a mistake

9 **The instantaneous rate of change of $f(x) = x^2$ at $x = 5$ is**

ANSWER _____

Understand It with Pulse | Flag a mistake

10 **Differentiating $f(x) = x^3 + x$ gives**

A $3x^2 + 1$

B $3x^2$

C $x^2 + 1$

D $3x + 1$

Understand It with Pulse | Flag a mistake

11 **The scalar multiple 2(2, 3) is**

- **A** (4, 5)
- **B** (4, 6)
- **C** (4, 3)
- **D** (2, 6)

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12 **A line through the origin in direction (1, 2) has parametric equations x equal to t and y equal to**

- **A** 2t
- **B** t
- **C** 2
- **D** $\frac{t}{2}$

Understand It with Pulse | Flag a mistake

13 **For $f(x) = x^2$ the instantaneous rate of change at x equal to 4 is**

A 9

B 7

C 8

D 4

Understand It with Pulse | Flag a mistake

14 **The derivative of $f(x) = (x + 4)^2$ is**

A $f'(x) = 2x + 4$

B $f'(x) = x + 4$

C $f'(x) = 2x$

D $f'(x) = 2x + 8$

Understand It with Pulse | Flag a mistake

15 **The scalar multiple 2 times the vector (3, -1) is**

- A (6, -2)
- B (3, -2)
- C (6, 1)
- D (5, 1)

Understand It with Pulse | Flag a mistake

16 **A line through the origin in direction (2, 1) has parametric equations x = 2t and y = t . The point on the line when t = 3 is**

- A (6, 3)
- B (3, 6)
- C (2, 1)
- D (5, 4)

Understand It with Pulse | Flag a mistake

17 The limit as x approaches 0 of $\sin \frac{3x}{x}$ is

- **A** 4
- **B** 1
- **C** 3
- **D** 0

Understand It with Pulse | Flag a mistake

18 The derivative of f(x) = sin 3x is

- **A** f'(x) = 3 cos 3x
- **B** f'(x) = cos 3x
- **C** f'(x) = -3 sin 3x
- **D** f'(x) = 3 sin 3x

Understand It with Pulse | Flag a mistake

19 **Adding vectors (2, 3) and (1, -1) gives**

A (3, 2)

B (1, 4)

C (3, 4)

D (2, 2)

Understand It with Pulse | Flag a mistake

20 **The line x = 1 + 2t, y = 3 + t passes through which point when t = 2 . The point is**

A (5, 5)

B (1, 3)

C (3, 4)

D (2, 1)

Understand It with Pulse | Flag a mistake

21 **A position function is $s(t) = 3t^2$ The average velocity from t equal to 1 to t equal to 3, in units per second, is**

- **A** 12
- **B** 14
- **C** 10
- **D** 15

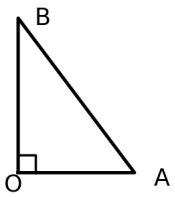
Understand It with Pulse | Flag a mistake

22 **The derivative of $f(x) = \cos 2x$ is**

- **A** $f'(x) = 2 \sin 2x$
- **B** $f'(x) = -\sin 2x$
- **C** $f'(x) = -2 \sin 2x$
- **D** $f'(x) = 2 \cos 2x$

Understand It with Pulse | Flag a mistake

23 **The triangle shown represents two vectors added head to tail. The magnitude of the resultant is Figure 3**



- **A** 17
- **B** 15
- **C** 13
- **D** 20

Understand It with Pulse | Flag a mistake

24 **The plane x + y + z = 4 has normal vector**

- **A** (4, 1, 1)
- **B** (1, 1, 1)
- **C** (1, 0, 0)
- **D** (0, 1, 1)

Understand It with Pulse | Flag a mistake

25 **A position function is $s(t) = 3t^2$ The instantaneous velocity at t equal to 2, in units per second, is**

- A 14
- B 12
- C 10
- D 6

Understand It with Pulse | Flag a mistake

26 **The derivative of $f(x) = e^{2x}$ is**

- A $f'(x) = 2e^{2x}$
- B $f'(x) = e^{2x}$
- C $f'(x) = 2e^{x}$
- D $f'(x) = 2xe^{2x}$

Understand It with Pulse | Flag a mistake

27 **Two vectors are collinear if one is a scalar multiple of the other. The vector (5, 10) is a scalar multiple of (1, 2) by a factor of**

- A 6
- B 2
- C 5
- D 1

Understand It with Pulse | Flag a mistake

28 **The distance from the origin to the plane x = 3 is**

- A 4
- B 0
- C 1
- D 3

Understand It with Pulse | Flag a mistake

29 **A position function is $s(t) = 3t^2$. The instantaneous velocity at $t = 2$, in metres per second, is**

ANSWER

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30 **By the chain rule, the derivative of $e^{(}2x)$ is**

A $2e^{(}2x)$

B $e^{(}2x)$

C e^{x}

D $2x\ e^{(}2x)$

Understand It with Pulse | Flag a mistake

31 **A displacement of 4 units east and 4 units north has magnitude, to two decimal places,**

- A 6.16
- B 5.66
- C 5.16
- D 8

Understand It with Pulse | Flag a mistake

32 **The cross product magnitude of (2, 1, 0) and (0, 1, 0) is**

- A 3
- B 1
- C 13
- D 2

Understand It with Pulse | Flag a mistake

33 The slope of the tangent to $y = x^2$ at x equal to 2 is

- **A** 2
- **B** 4
- **C** 6
- **D** 15

Understand It with Pulse | Flag a mistake

34 The derivative of f(x) = ln 4x is

- **A** $f'(x) = \frac{4}{x}$
- **B** $f'(x) = \frac{1}{x}$
- **C** $f'(x) = \frac{1}{4x}$
- **D** $f'(x) = x$

Understand It with Pulse | Flag a mistake

35 **The direction angle of vector (5, 12) to the nearest degree is**

A 72

B 62

C 67

D 45

Understand It with Pulse | Flag a mistake

36 **Two lines are parallel if their direction vectors are scalar multiples. The direction (2, 4) is parallel to (1, 2) because the scalar factor is**

A 13

B 1

C 2

D 3

Understand It with Pulse | Flag a mistake

37 **The slope of the tangent to $y = x^2$ at x equal to 5 is**

A 10

B 5

C 12

D 25

Understand It with Pulse | Flag a mistake

38 **The derivative of $f(x) = x(x + 3)$ at x equal to 1 is**

A 6

B 4

C 3

D 5

Understand It with Pulse | Flag a mistake

39 **A vector has components (12, 16) Its magnitude is**

- A 21
- B 20
- C 19
- D 28

Understand It with Pulse | Flag a mistake

40 **Two lines are parallel if their direction vectors are scalar multiples. The direction (2, 10) is parallel to (1, 5) because the scalar factor is**

- A 5
- B 1
- C 2
- D 3

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41 **The slope of the secant to $y = x^2$ from x equal to 1 to x equal to 4 is**

A 4

B 6

C 5

D 8

Understand It with Pulse | Flag a mistake

42 **The second derivative of $f(x) = x^3 + 2x$ at x equal to 2 is**

A 6

B 24

C 14

D 12

Understand It with Pulse | Flag a mistake

43 **A vector has components (10, 24) Its magnitude is**

- A 27
- B 25
- C 26
- D 34

Understand It with Pulse | Flag a mistake

44 **The angle between vectors (8, 0) and (0, 15) in degrees, is**

- A 90
- B 0
- C 45
- D 180

Understand It with Pulse | Flag a mistake

45 For $f(x) = 2x^2$ the instantaneous rate of change at x equal to 7 is

- A 30
- B 26
- C 14
- D 28

Understand It with Pulse | Flag a mistake

46 The second derivative of $f(x) = x^3 + 5x$ at x equal to 2 is

- A 6
- B 24
- C 12
- D 17

Understand It with Pulse | Flag a mistake

47 **A vector has components (27, 36) Its magnitude is**

A 46

B 45

C 44

D 63

Understand It with Pulse | Flag a mistake

48 **The point (4, 4, 4) lies on the plane x + y + z = 12 True or false? It is**

A false

B unknown

C sometimes

D true

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49 For $f(x) = 2x^2$ the instantaneous rate of change at x equal to 10 is

- A 42
- B 40
- C 38
- D 20

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50 The critical point of $f(x) = x^2 - 8x$ is x equal to

- A 5
- B 4
- C 3
- D 8

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ANSWER KEY

1. D
2. D
3. B
4. A
5. C
6. D
7. B
8. D
9. 10
10. A
11. B
12. A
13. C
14. D
15. A
16. A
17. C
18. A
19. A
20. A
21. A
22. C
23. B
24. B
25. B
26. A
27. C
28. D
29. 12
30. A
31. B
32. D
33. B
34. B
35. C
36. C
37. A
38. D
39. B
40. C
41. C
42. D
43. C
44. A
45. D
46. C
47. B
48. D
49. B
50. B

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