NUNAVUT MATH 31 · 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 value of $\lim_{x \to 4} x^2 - 16/x - 4$ is

- **A** 4
- **B** does not exist
- **C** 0
- **D** 8

Understand It with Pulse | Flag a mistake

2 **The derivative of a function f at x = 2, written using the limit definition, is**

- **A** $\lim_{h \to 0} f(2 + h)/h$
- **B** $\lim_{h \to 0} f(2) - f(2 + h)/h$
- **C** $\lim_{x \to 2} (f(x) - f(2))$
- **D** $\lim_{h \to 0} f(2 + h) - f(2)/h$

Understand It with Pulse | Flag a mistake

3 **The critical numbers of the function $f(x) = x^3 - 12x$ are**

- **A** x = 2 only
- **B** x = -2 and x = 2
- **C** x = 0 only
- **D** x = -4 and x = 4

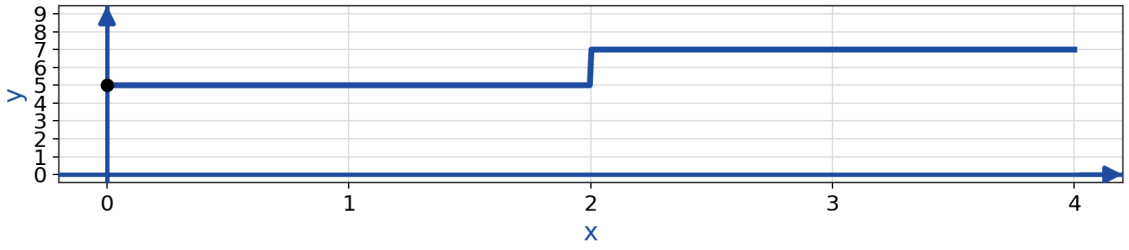
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4 $\int (2x - 3)\, dx$ is equal to

- **A** $x^2 + C$
- **B** $x^2 - 3x + C$
- **C** $2x^2 - 3x + C$
- **D** $x^2 - 3 + C$

Understand It with Pulse | Flag a mistake

5 For the function f whose graph is shown, the value of $\lim_{x \to 2} f(x)$ is



- **A** 5
- **B** 7
- **C** does not exist
- **D** 6

Understand It with Pulse | Flag a mistake

6 **If $f(x) = (2x + 1)^3$, then $f'(x)$ is**

- A $3(2x + 1)^2$
- B $2(2x + 1)^2$
- C $6(2x + 1)^2$
- D $6(2x + 1)^3$

Understand It with Pulse | Flag a mistake

7 **The function $f(x) = x^4 - 2x^2 + 1$ is increasing on the intervals**

- A $(-1, 0)$ and $(1, \infty)$
- B $(-\infty, -1)$ and $(0, 1)$
- C $(0, \infty)$ only
- D $(-\infty, 0)$ only

Understand It with Pulse | Flag a mistake

8 $\int (x + 1/x)^2 \, dx$ is equal to

- **A** $x^3/3 + 1/x + C$
- **B** $x^3/3 + 2x - 1/x + C$
- **C** $(x + 1/x)^3/3 + C$
- **D** $x^3/3 + 2x + 1/x + C$

Understand It with Pulse | Flag a mistake

9 At x = -5, the function f(x) = 1/x + 5 has

- **A** a removable discontinuity
- **B** a jump discontinuity
- **C** no discontinuity; f is continuous there
- **D** an infinite discontinuity

Understand It with Pulse | Flag a mistake

10 **d/dx[sin(3x)] is**

- A cos(3x)
- B 3cos(3x)
- C -3cos(3x)
- D 3sin(3x)

Understand It with Pulse | Flag a mistake

11 **The graph of $f(x) = x^3 - 3x^2 + 2$ has an inflection point at**

- A x = 0
- B x = 1
- C x = 2
- D no inflection point

Understand It with Pulse | Flag a mistake

12 $\int (3/x + e^x)\, dx$ is equal to

A $3\ln|x| + e^x + C$

B $3/x^2 + e^x + C$

C $\ln|x| + e^x + C$

D $3\ln|x| + e^x/x + C$

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13 Let $f(x) = x^2 - 4/x - 2$ for $x \neq 2$, and let $f(2) = k$. If f is continuous at $x = 2$, then the value of k is

A 2

B 0

C no such value exists

D 4

Understand It with Pulse | Flag a mistake

14 For the relation $x^2 + y^2 = 25$, dy/dx is

- **A** $-x/y$
- **B** $\frac{x}{y}$
- **C** $-y/x$
- **D** $\frac{y}{x}$

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15 A farmer has 600 m of fencing to enclose a rectangular field along a straight river. The side along the river needs no fence. The greatest area that can be enclosed, in m^2, is

- **A** 45 000
- **B** 22 500
- **C** 30 000
- **D** 90 000

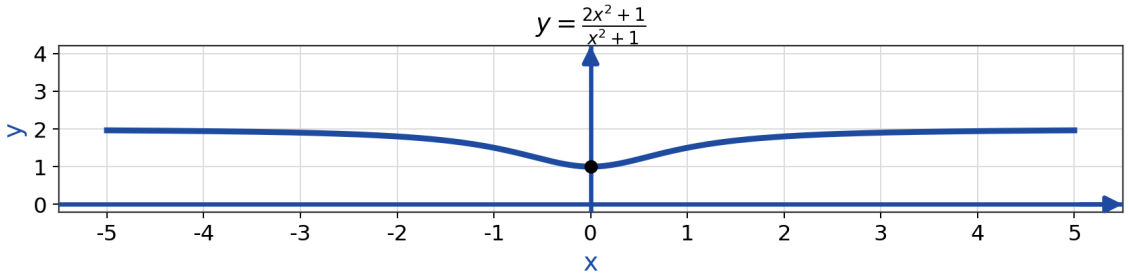
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16 **If $F(x) = \int_2^x (t^3 + 1)\,dt$, then $F'(x)$ is**

- **A** $x^4/4 + x$
- **B** $3x^2$
- **C** x^3
- **D** $x^3 + 1$

Understand It with Pulse | Flag a mistake

17 **The graph of a function f is shown. The graph of f has a horizontal asymptote with equation**



- **A** y = 0
- **B** y = 6
- **C** y = 2
- **D** there is no horizontal asymptote

Understand It with Pulse | Flag a mistake

18 **d/dx[tan x] is**

- **A** sec x tan x
- **B** $\sec^2 x$
- **C** $-\sec^2 x$
- **D** $\csc^2 x$

Understand It with Pulse | Flag a mistake

19 **A circular oil spill has radius 10 m and its radius is increasing at 0.5 m/min. The area of the spill is increasing at _____ m^2/min. Record your answer to the nearest tenth.**

ANSWER _____

Understand It with Pulse | Flag a mistake

20 **The exact value of $\int_0^9 \sqrt{x}\,dx$ is _____ Record your answer as an integer.**

ANSWER _____

Understand It with Pulse | Flag a mistake

21 The value of $\lim_{x \to 2} 1/(x - 2)^2$ is

- **A** 0
- **B** $-\infty$
- **C** ∞
- **D** 4

Understand It with Pulse | Flag a mistake

22 For the relation $x^2 + xy = 10$, the value of dy/dx at the point (1, 9) is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

23 The graph of $f(x) = x^4 - 6x^2$ changes concavity at each of its inflection points. The number of inflection points of the graph is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

24 The average value of f(x) = sin x on the interval [0, π] is

- **A** 1/π
- **B** 2
- **C** π/2
- **D** 2/π

Understand It with Pulse | Flag a mistake

25 The average rate of change of $f(x) = x^2 + 2x$ on the interval $1 \le x \le 3$ is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

26 If $f(x) = \sin \frac{x}{x}$, then $f'(x)$ is

A $\cos \frac{x}{x}$

B $x \sin x + \cos \frac{x}{x^2}$

C $x \cos x - \sin \frac{x}{x^2}$

D $\sin x - x \cos \frac{x}{x^2}$

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27 **Water flows into a conical tank, point down, with radius 3 m and height 6 m, at 2 m^3/min. When the water is 2 m deep, the depth is increasing at _____ m/min. Record your answer to the nearest hundredth.**

ANSWER _____

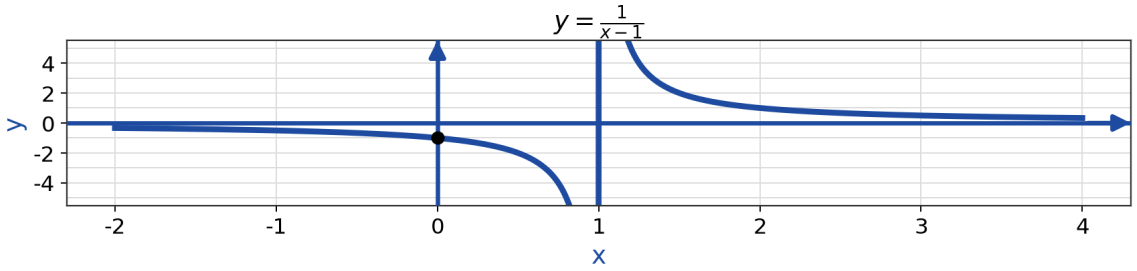
Understand It with Pulse | Flag a mistake

28 **The value of $\int_0^1 e^{2x}\,dx$, to the nearest hundredth, is _____ Record your answer to the nearest hundredth.**

ANSWER _____

Understand It with Pulse | Flag a mistake

29 **The graph of a function f is shown. At x = 1, the function f has a discontinuity that is**



A removable

B a jump discontinuity

C an infinite discontinuity

D not a discontinuity; f is continuous there

Understand It with Pulse | Flag a mistake

30 **d/dx[5^{3x}] is**

A $5^{3x} \ln 5$

B $3 \cdot 5^{3x}$

C 5^{3x}

D $3 \ln 5 \cdot 5^{3x}$

Understand It with Pulse | Flag a mistake

31 **The function $f(x) = 3x^2 - 12$ is increasing on the interval**

- A $(-\infty, 0)$
- B $(0, \infty)$
- C $(-2, 2)$
- D all real numbers

Understand It with Pulse | Flag a mistake

32 **$\int 7\,dx$ is equal to**

- A $7 + C$
- B $7x + C$
- C $x/7 + C$
- D $7x^2/2 + C$

Understand It with Pulse | Flag a mistake

33 The value of $\lim_{x \to 4} x^2 - 6x + 8/x - 4$ is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

34 If $f(x) = x^2 + 3x$, then the value of $f'(-1)$ is ____

ANSWER _____

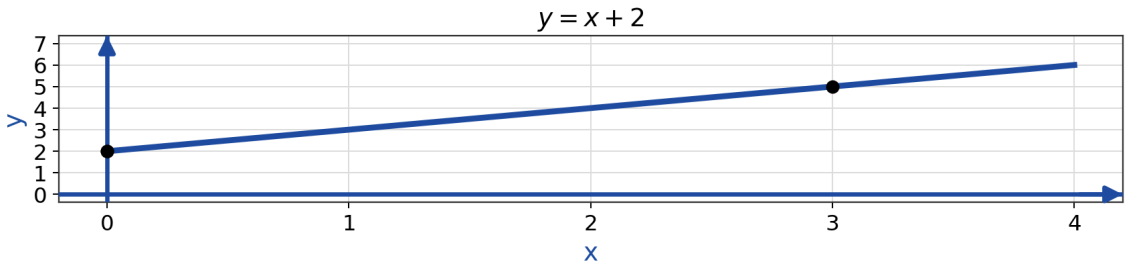
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35 The positive critical number of the function $f(x) = x^3 - 27x$ is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

36 The graph of a function f is shown. The value of $\int_0^3 f(x)\,dx$ is



A 10

B 10.5

C 12

D 9

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37 The value of $\lim_{x \to -2} x^2 + 3x + 2/x + 2$ is

A -1

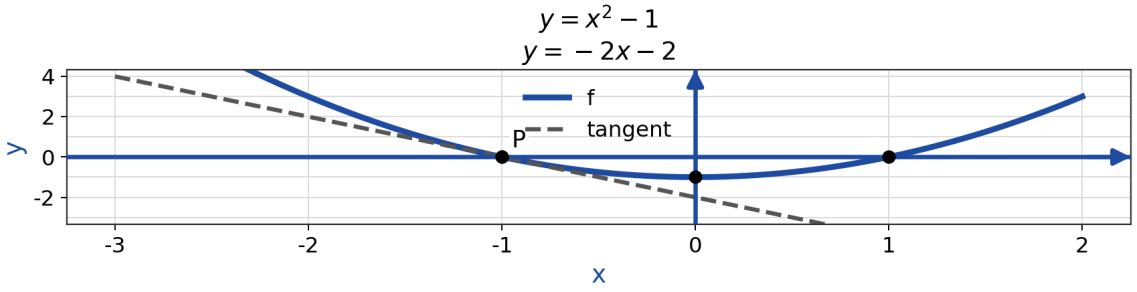
B 0

C 1

D does not exist

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38 **For the function f whose graph and tangent line at P are shown, the slope of the tangent line at P is**



A 2

B 0

C -1

D -2

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39 **A 13 m ladder leans against a wall. Its bottom is 12 m from the wall and is being pulled away at 1 m/s. The top of the ladder is sliding down at _____ $\frac{m}{s}$. Record your answer to the nearest tenth.**

ANSWER _____

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40 The value of $\int_0^1 e^x \, dx$ is

- **A** e - 1
- **B** e
- **C** 1
- **D** e + 1

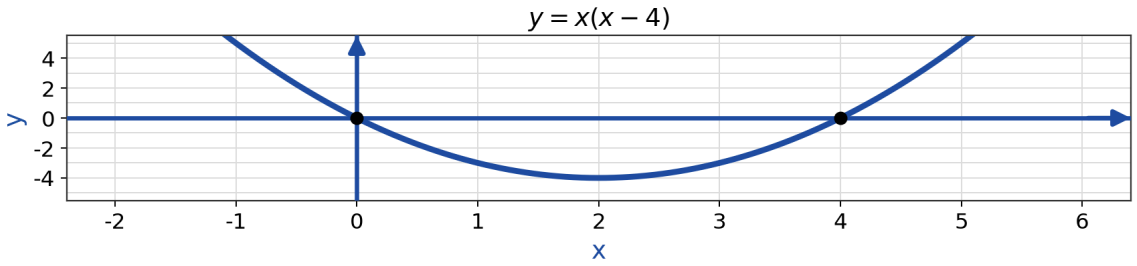
Understand It with Pulse | Flag a mistake

41 The value of $\lim_{x \to 7} \sqrt{x + 2} - 3/x - 7$ is

- **A** 6
- **B** $\frac{1}{3}$
- **C** $\frac{1}{6}$
- **D** 0

Understand It with Pulse | Flag a mistake

42 **The graph of f', the derivative of f, is shown. The function f is decreasing on the interval**



A (-2, 2)

B (-∞, -2) and (2, ∞)

C (2, ∞) only

D never

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43 **A particle moves with position $s(t) = t^3 - 12t + 5$, where $t \geq 0$. The particle moves in the negative direction when**

A $t > 2$

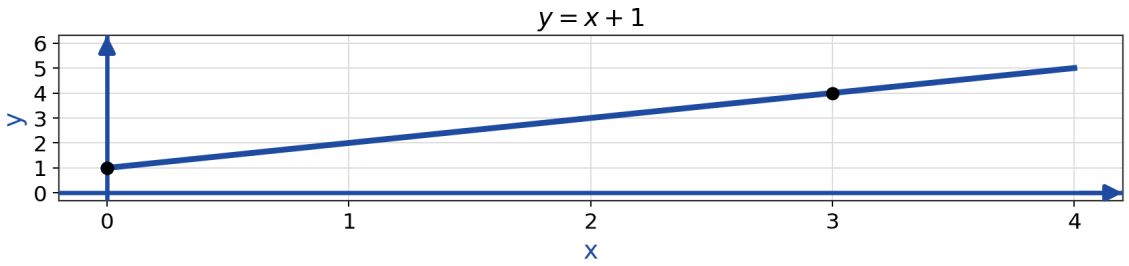
B never

C $0 < t < 2$

D $0 < t < 4$

Understand It with Pulse | Flag a mistake

44 For the function f whose graph is shown, the area of the region under the graph of f and above the x-axis, from x = 0 to x = 3, is



A 7.5

B 6

C 9

D 4.5

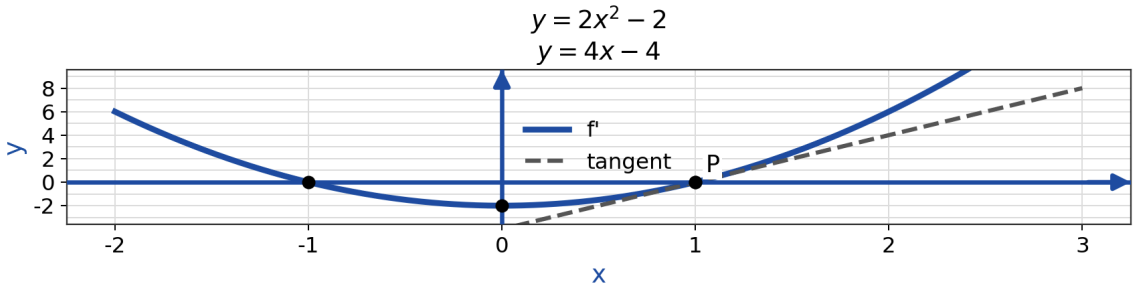
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45 The value of $\lim_{x \to 0} (1/x - 1/x^2 + x)$ is _____

ANSWER _____

Understand It with Pulse | Flag a mistake

46 **The graph of f' and the tangent line at P are shown. The value of f''(1) is _____**



ANSWER

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47 **The radius of a sphere is decreasing at 0.5 cm/s. At the instant when the radius is 10 cm, the surface area of the sphere is decreasing at**

A 40π cm²/s

B 20π cm²/s

C 80π cm²/s

D 10π cm²/s

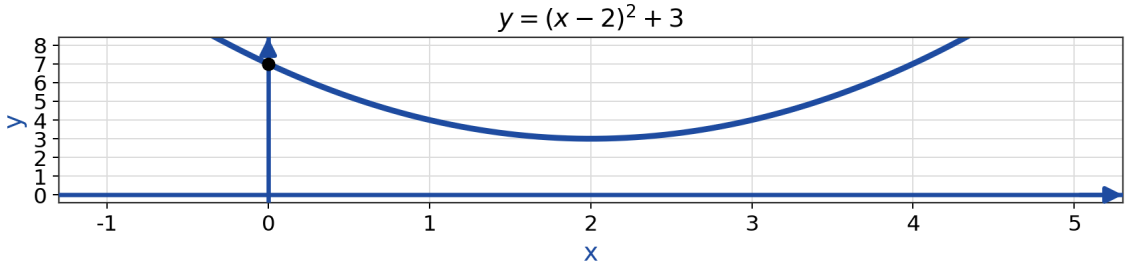
Understand It with Pulse | Flag a mistake

48 The value of $\int_0^4 1/x + 1\,dx$, to the nearest hundredth, is _____ Record your answer to the nearest hundredth.

ANSWER _____

Understand It with Pulse | Flag a mistake

49 The graph of a function f is shown. The value of $\lim_{x \to 2} f(x)$ is



A 3

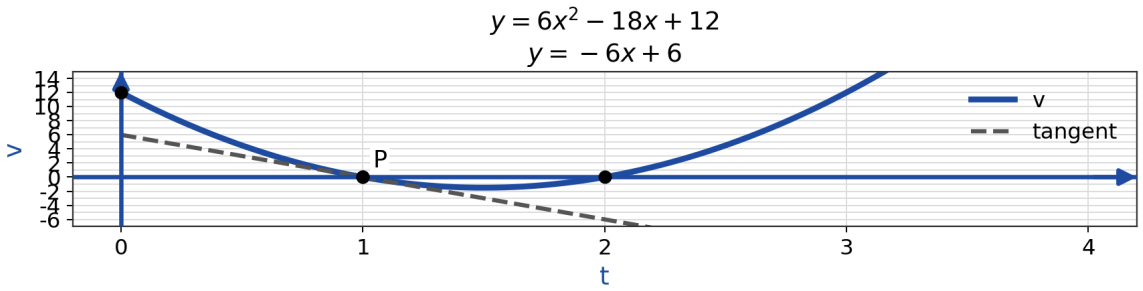
B 5

C 2

D does not exist

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50 **The graph of the velocity of an object is shown, with the tangent line at P. The acceleration of the object at t = 1 s, in $\frac{m}{s^2}$, is _____**



ANSWER

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ANSWER KEY

1.	D	**18.**	B	**35.**	3
2.	D	**19.**	31.4	**36.**	B
3.	B	**20.**	18	**37.**	A
4.	B	**21.**	C	**38.**	D
5.	C	**22.**	-11	**39.**	2.4
6.	C	**23.**	2	**40.**	A
7.	A	**24.**	D	**41.**	C
8.	B	**25.**	6	**42.**	B
9.	D	**26.**	C	**43.**	C
10.	B	**27.**	0.64	**44.**	A
11.	B	**28.**	3.19	**45.**	1
12.	A	**29.**	C	**46.**	4
13.	D	**30.**	D	**47.**	A
14.	A	**31.**	B	**48.**	1.61
15.	A	**32.**	B	**49.**	A
16.	D	**33.**	2	**50.**	-6
17.	C	**34.**	1		

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