ALBERTA MATH 31 · UNIT 3 · 10 QUESTIONS

Applications of Derivatives — 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 **Two numbers differ by 6. The minimum possible value of the sum of their squares is**

- A 36
- B 18
- C 9
- D 20

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2 **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 _____ m/s. Record your answer to the nearest tenth.**

ANSWER _____

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3 **The function $f(x) = x^3 - 3x^2 - 9x + 5$ has a local maximum at**

A $x = -1$

B $x = 3$

C $x = 1$

D $x = -3$

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4 **The absolute maximum value of $f(x) = -x^2 + 6x - 5$ on the interval $[0, 5]$ is**

A 0

B 3

C 9

D 4

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5 **A closed right circular cylinder has a volume of 128π cm^3. If the total surface area of the cylinder is as small as possible, its radius, in centimetres, is _____**

ANSWER _____

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6 **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 $0 < t < 4$

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

- **A** (-∞, 0)
- **B** (4, ∞)
- **C** (2, ∞)
- **D** (0, 4)

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8 **A particle has position $s(t) = t^4 - 4t^3 + 2$ metres at time t seconds. The acceleration of the particle at t = 3 s, in m/s², is _____**

ANSWER _____

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9 **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

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10 **The graph of $f(x) = x^4 - 12x^2$ is concave down on the interval**

- **A** $(-2, 2)$
- **B** $(-\sqrt{2}, \sqrt{2})$
- **C** $(\sqrt{2}, \infty)$
- **D** $(-\infty, -\sqrt{2})$

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ANSWER KEY

1. B
2. 2.4
3. A
4. D
5. 4
6. C
7. D
8. 36
9. A
10. B

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