

Practice Questions for AP Calculus AB Exam: Section I

2. Find $\lim_{x \rightarrow 1} \frac{x^2 - 3x + 2}{x - 1}$.

- (A) 2
- (B) 1
- (C) 0
- (D) -1
- (E) Does not exist

3. For what value(s) of k , if any, is $f(x) = \begin{cases} k^2 - x^2 & \text{if } x < 2 \\ 2(x+k) & \text{if } x \geq 2 \end{cases}$ continuous on $(-\infty, \infty)$?

- (A) -4, -2
- (B) 2
- (C) 4
- (D) -2, 4
- (E) Does not exist

4. If $f(x) = 2x\sqrt{8x-1}$, then $f'(x)$ is

- (A) $x\sqrt{8x-1}$
- (B) $\frac{8x}{\sqrt{8x-1}}$
- (C) $2\sqrt{8x-1} + 8x$
- (D) $2\sqrt{8x-1} + \frac{8x}{\sqrt{8x-1}}$
- (E) $2 + \frac{8x}{\sqrt{8x-1}}$

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5. $\int \frac{8}{1+8x} dx =$

(A) $8x + \ln|8x| + C$

(B) $\ln|1+8x| + C$

(C) $\ln|8x| + C$

(D) $\frac{1}{8} \ln|1+8x| + C$

(E) $-\frac{1}{8} \ln|1+8x| + C$

6. A particle moves along the x -axis so that at any time $t \geq 0$, its velocity is given by

$v(t) = \cos(4t)$. If the position of the particle at time $t = \frac{\pi}{8}$ is $x = \frac{7}{4}$, what is the particle's position at time $t = 0$?

(A) $\frac{2}{3}$

(B) $\frac{5}{4}$

(C) $-\frac{1}{2}$

(D) 0

(E) $\frac{3}{2}$

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10. Given $f(x) = \frac{x^4 - 27}{x^2}$, for what values of x is the graph of f concave downwards?

- (A) $-3 < x < 0$
- (B) $0 < x < 3$
- (C) $3 < x < \infty$
- (D) $-3 < x < 0$ and $0 < x < 3$
- (E) $-\infty < x < -3$ and $3 < x < \infty$

11. Let f be defined by $f(x) = |x - 6|$ for all real numbers x . For what values of x is the function increasing?

- (A) $(-\infty, -6)$
- (B) $(-\infty, 6)$
- (C) $[-6, 0)$
- (D) $(0, 6)$
- (E) $(6, \infty)$

12. Find an equation for the line tangent to the graph of $f(x) = \sqrt{x - 7}$ at the point where $x = 16$

- (A) $y = 6x - 2$
- (B) $y = \frac{1}{6}x - \frac{1}{3}$
- (C) $y = \frac{1}{6}x + \frac{1}{3}$
- (D) $y = -6x - 2$
- (E) $y = -\frac{1}{6}x + \frac{1}{3}$

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19. What is the equation of the line tangent to the curve $y = x^3 - 2x^2$ at the point $(2, 0)$?

(A) $y = -4x - 8$

(B) $y = 4x + 8$

(C) $y = 4x - 8$

(D) $y = \frac{1}{4}x - 8$

(E) $y = -\frac{1}{4}x + 8$

20. A particle moves along the x -axis so that its velocity at any time $t \geq 0$ is given by $v(t) = 4t^3 - 4t$. Which of the following expressions could represent the position $x(t)$ of the particle at any time $t \geq 0$?

(A) $t^3 - 2t^2 + 4$

(B) $t^3 - 2t^3$

(C) $t^4 - 2t^2 + 4$

(D) $t^4 - 2t - 3$

(E) $t^4 - 4t^2 + 4$

21. What is the slope of the tangent line to $x^2 + xy + y^2 = 3$ that lies in the first quadrant at the point where $y = 1$?

(A) -2

(B) -3

(C) 3

(D) -1

(E) 1