

AB Mock 1 Review

1) A sphere's volume is increasing at a rate of 2π cubic cm/min. How fast is the radius changing when the radius is 6 cm?

2) Evaluate: $\lim_{x \rightarrow 0} \frac{\sin x \cos x}{x}$

3) Let f be the function $f(x) = 2x^3 + x$. If $f(x)$ and $g(x)$ are inverses, find $g'(3)$.

4) Approximate $\sqrt{25.01}$ using tangent line approximation.

5) In the xy plane, write an equation of the line tangent the graph of $x^2 + xy + y^2 = 7$ at the point $(2, 1)$.

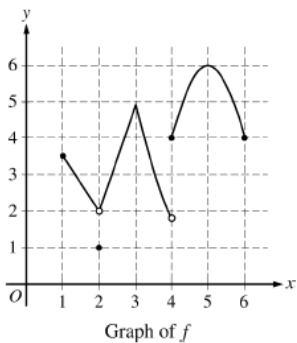
6) Let f be the function defined below, where c and d are constants. If f is differentiable at $x = 2$, what is the value of c and d ?

$$f(x) = \begin{cases} cx + d & x \leq 2 \\ x^2 - cx & x > 2 \end{cases}$$

7) Evaluate: $\lim_{h \rightarrow 0} \frac{\sec\left(\frac{\pi}{3} + h\right) - 2}{h} =$

8) If $f(x) = \sqrt{x^2 - 4}$ and $g(x) = 3x - 2$, find the derivative of $f(g(x))$ at $x = 3$.

9)



The graph of the function f is shown above. Which of the following statements is false?

(A) $\lim_{x \rightarrow 2} f(x)$ exists.

(B) $\lim_{x \rightarrow 3} f(x)$ exists.

(C) $\lim_{x \rightarrow 4} f(x)$ exists.

(D) $\lim_{x \rightarrow 5} f(x)$ exists.

(E) The function f is continuous at $x = 3$.

10)

The function f is continuous for $-2 \leq x \leq 1$ and differentiable for $-2 < x < 1$. If $f(-2) = -5$ and $f(1) = 4$, which of the following statements could be false?

(A) There exists c , where $-2 < c < 1$, such that $f(c) = 0$.

(B) There exists c , where $-2 < c < 1$, such that $f'(c) = 0$.

(C) There exists c , where $-2 < c < 1$, such that $f(c) = 3$.

(D) There exists c , where $-2 < c < 1$, such that $f'(c) = 3$.

(E) There exists c , where $-2 \leq c \leq 1$, such that $f(c) \geq f(x)$ for all x on the closed interval $-2 \leq x \leq 1$.

Answers

1.) $1/72 \text{ cm/min}$

2) 1

3) $1/7$

4) 5.001

5) $y - 1 = \frac{-5}{4}(x - 2)$

6) $c = 2$; $d = -4$

7) $2\sqrt{3}$

8) $\frac{7}{\sqrt{5}}$

9) C

10) B