

## Question 1: Derivative at a point

1. If  $g(x) = \frac{1}{32}x^4 - 5x^2$  find  $g'(4)$ .

- (A) -72
- (B) -32
- (C) -24
- (D) 24
- (E) 32

## Question 3: Limit of a Rational Function

3.  $\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5}$  is

- (A) 0
- (B) 10
- (C) -10
- (D) 5
- (E) The limit does not exist.

## Question 2: Domain of a Function

2. The domain of the function  $f(x) = \sqrt{4 - x^2}$  is

- (A)  $x < -2$  or  $x > 2$
- (B)  $x \leq -2$  or  $x \geq 2$
- (C)  $-2 < x < 2$
- (D)  $-2 \leq x \leq 2$
- (E)  $x \leq 2$

## Question 4: Derivative of a Rational Function

4. If  $f(x) = \frac{x^5 - x + 2}{x^3 + 7}$ , find  $f'(x)$ .

- (A)  $\frac{(5x^4 - 1)}{(3x^2)}$
- (B)  $\frac{(5x^4 - 1) - (3x^2)}{(x^3 + 7)}$
- (C)  $\frac{(x^3 + 7)(5x^4 - 1) - (x^5 - x + 2)(3x^2)}{(x^3 + 7)}$
- (D)  $\frac{(x^5 - x + 2)(3x^2) - (x^3 + 7)(5x^4 - 1)}{(x^3 + 7)^2}$
- (E)  $\frac{(x^3 + 7)(5x^4 - 1) - (x^5 - x + 2)(3x^2)}{(x^3 + 7)^2}$

Question 5: Limit Definition

5. Evaluate  $\lim_{h \rightarrow 0} \frac{5\left(\frac{1}{2} + h\right)^4 - 5\left(\frac{1}{2}\right)^4}{h}$ .

(A)  $\frac{5}{2}$

(B)  $\frac{5}{16}$

(C) 40

(D) 160

(E) The limit does not exist.

Free Response part 1

1. Consider the curve defined by  $y = x^4 + 4x^3$ .

- (a) Find the equation of the tangent line to the curve at  $x = -1$ .
- (b) Find the coordinates of the absolute minimum.
- (c) Find the coordinates of the point(s) of inflection.

Show work for part a)

Show work for part b)

Show work for part c)