1) Find this limit, if possible.

$$\lim_{x \to -2} \frac{2x^2 - x - 10}{x^2 - 4}$$

A. $-\frac{9}{4}$

B. $\frac{9}{4}$

C. 0

D. $\frac{1}{4}$

E. Limit does not exist.

2) Find this limit, if possible.

$$\lim_{x \to \infty} \frac{5x^2 - 3x + 9}{2x^3 - 3x + 1}$$

A. ∞

B. $\frac{5}{2}$

C. 1

D. 0

E. Limit does not exist.

3) Find the <u>average rate of change</u> for the following function on the given interval.

$f(x) = -x^3 + 5x^2 + 1$ from $x = -2$ to $x = 3$

A. 30

B. 6

C. -8

D. -10

E. -2

4) Find the x-coordinate only of any point(s) at which the graph of the function below has a horizontal tangent line.

$$f(x) = \frac{2}{3}x^3 + x^2 - 12x - 6$$

A. $x = -3,\ 0,\ 2$

B. $x = 12$

C. $x = -3,\ 2$

D. $x = -12$

E. $x = -2,\ 3$

5) If $f(x) = \dfrac{1-4x}{2x+3}$, find the value of the derivative at the point $\left(1, -\frac{3}{5}\right)$.

A. $-\frac{26}{25}$

B. $\frac{14}{25}$

C. $\frac{26}{25}$

D. $-\frac{18}{25}$

E. $-\frac{14}{25}$

6) The revenue, in dollars, from selling x compact disk players is $R(x) = \dfrac{3000}{x} + 100x$. Use a marginal function to estimate the **additional** revenue of the 11th compact disk player after 10 have been sold.

A. \$70.00

B. \$72.00

C. \$72.73

D. \$74.00

E. \$74.79

7) Find $D_x\left[\dfrac{(5x-3)(2x+7)}{3x+7}\right]$.

A. $\dfrac{-30x^2-57x+133}{(3x+7)^2}$

B. $\dfrac{30x^2+140x+266}{(3x+7)^2}$

C. $\dfrac{-30x^2-57x+133}{(3x+7)^2}$

D. $\dfrac{30x^2+256x+182}{(3x+7)^2}$

E. $\dfrac{30x^2+140x+182}{(3x+7)^2}$

8) The height above the water of a diver is given by the position function below, where *h* is the height above the water in feet and *t* is time in seconds. What is the velocity of the diver when he hits the water? **Hint: First, you will need to find the time when he hits the water (height is zero feet).**

$$h(t) = -16t^2 + 16t + 32$$

A. -24 feet per second

B. -16 feet per second

C. -36 feet per second

D. -48 feet per second

E. -60 feet per second

9) Find the derivative of the function below.

$$f(x) = (x^2 - 2x + 1)(3x - 2)$$

A. $9x^2 - 16x + 7$

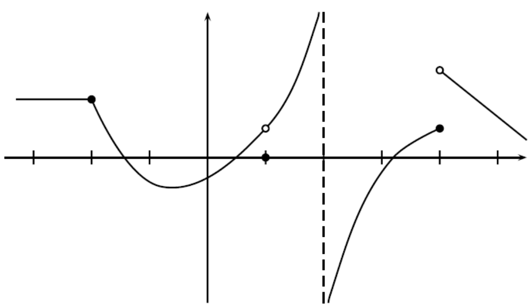
B. $9x^2 - 4x - 4$

C. $3x^3 - 8x^2 + 7x - 2$

D. $6x - 6$

E. $9x^2 - 10x + 3$

10) Find all value(s) of *x* where the derivative does not exist. Each hash mark on the *x*-axis represents one unit.



A. $x = 2,\ x = 4$

B. $x = 1,\ x = 4$

C. $x = -2,\ x = 1,\ x = 2,\ x = 4$

D. $x = 2$

E. $x = 1,\ x = 2,\ x = 4$

11) Below is a function *f* and its derivative, f'. Find the equation of the line tangent to the graph of *f* at the point, $(-2, -2)$.

$$f(x) = \frac{5x}{x^2 + 1} \qquad f'(x) = \frac{5 - 5x^2}{(x^2 + 1)^2}$$

A. $y = \frac{1}{25}x - \frac{48}{25}$

B. $y = -\frac{3}{5}x + \frac{4}{5}$

C. $y = x + 4$

D. $y = -\frac{3}{5}x - \frac{16}{5}$

E. $y = \frac{1}{25}x + \frac{48}{25}$

12) If $y = 4x(x^2 - 1)^3$, then y' is equivalent to which choice? Note: You will need to factor your derivative.

A. $4(x^2 - 1)^2(7x^2 - 1)$
B. $4(x^2 - 1)^2(x^2 + 6x - 1)$
C. $4(x^2 - 1)^2(x^2 + 3x - 1)$
D. $12x(x^2 - 1)^2$
E. $24x^2(x^2 - 1)^2$

13) The daily cost function for production of a particular type of calculator is $C(x) = 0.0001x^3 - 0.08x^2 + 40x + 5000$ dollars, where x is the number of calculators produced. What is the instantaneous rate of change in cost at the time the 59th calculator is produced?

A. $\$31.12\,/\,calculator$
B. $\$31.48\,/\,calculator$
C. $\$31.54\,/\,calculator$
D. $\$31.72\,/\,calculator$
E. $\$31.60\,/\,calculator$

14) Find the derivative of $g(x) = (2x^2 - 5x + 1)^3$.

A. $g'(x) = 3(4x-5)^2$
B. $g'(x) = 3(4x-5)(2x^2-5x+1)^2$
C. $g'(x) = 12x(2x^2-5x+1)^2$
D. $g'(x) = 12(4x-5)^2$
E. $g'(x) = (12x-5)(2x^2-5x+1)^2$

15) If $y = \dfrac{2}{(5x+1)^3}$, find $\dfrac{dy}{dx}$.

A. $\dfrac{-6}{(5x+1)^4}$
B. $\dfrac{-30}{(5x+1)^2}$
C. $\dfrac{-10}{3(5x+1)^{4/3}}$
D. $\dfrac{-30}{(5x+1)^4}$
E. $\dfrac{30}{(5x+1)^4}$