1) Evaluate this limit. $\lim_{x\to 3}\left(\frac{3x^2-7x-6}{4x^2-11x-3}\right)$

A. $\frac{3}{4}$

B. $\frac{7}{11}$

C. 0

D. $\frac{11}{13}$

E. This limit does not exist.

2) Find y' if $y=\frac{1}{2}x^6-2\sqrt{x}+\frac{3}{x}$.

A. $y'=3x^5-\frac{1}{\sqrt{x}}+3$

B. $y'=3x^5+\frac{1}{x^{3/2}}-\frac{3}{x^2}$

C. $y'=3x^5-\frac{1}{\sqrt{x}}-\frac{3}{x^2}$

D. $y'=3x^5+\frac{1}{x^{3/2}}+3$

E. $y'=3x^5+\frac{1}{\sqrt{x}}-\frac{3}{x^2}$

3) Find $\frac{dy}{dx}$ if $y=(2x-1)(3x^2-4x+7)$.

A. $\frac{dy}{dx}=18x^2-22x+18$

B. $\frac{dy}{dx}=12x^2-8x$

C. $\frac{dy}{dx}=18x^2-14x+14$

D. $\frac{dy}{dx}=12x-8$

E. $\frac{dy}{dx}=18x^2-22x+10$

4) Find the average rate of change of the function $f(x) = \dfrac{3x^2 + 2x - 7}{x}$ on the interval from $x = 1$ to $x = 2$.

A. $\frac{5}{4}$
B. $\frac{13}{2}$
C. $\frac{17}{4}$
D. $\frac{7}{2}$
E. $\frac{53}{4}$

5) Suppose a company has the revenue and cost functions given below, in dollars, for producing and selling x units of a product.

$R(x) = 22.2x - 1.2x^2$

$C(x) = 0.4x^2 + 3x + 40$

Find the marginal profit when 5 units of the product have been produced and sold.

A. \$10.80
B. \$9.20
C. \$4.80
D. \$1.60
E. \$3.20

6) Find the equation in slope-intercept form of a line through the points $(2, -1)$ and $(-3, -4)$.

A. $y = \frac{3}{5}x - \frac{1}{5}$
B. $y = -5x + 9$
C. $y = x - 3$
D. $y = \frac{3}{5}x - \frac{11}{5}$
E. $y = x - 1$

7) Find the x-coordinates of all of the points where the slope of the tangent to the graph of f is 12.

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

A. $x = -4,\ x = 3$
B. $x = -2,\ x = 6$
C. $x = 9,\ x = 14$
D. $x = -1,\ x = 0$
E. $x = -3,\ x = 2$

8) A study suggests that in t years from now, the population of a certain small community in Indiana will be $P(t) = 18 - \frac{5}{2t+1}$, where P is in thousands. Find the instantaneous rate of change of the population P with respect to time t.

A. $\frac{5}{(2t+1)^2}$ thousand people per year
B. $\frac{10}{(2t+1)^2}$ thousand people per year
C. $\frac{-5}{(2t+1)^2}$ thousand people per year
D. $\frac{-10}{(2t+1)^2}$ thousand people per year
E. $\frac{-13}{(2t+1)^2}$ thousand people per year

9) The distance an object travels is given by $s(t) = \frac{2}{3}t^3 - 7t^2 + 20t$. Find t when its velocity is zero.

A. $t = 0,\ t = 2,\ t = 5$
B. $t = \frac{51}{4}$
C. $t = \frac{7}{2}$
D. $t = 0,\ t = \frac{7}{2}$
E. $t = 2,\ t = 5$

10) During the first part of a canoe trip, Joe travels 42 miles at a constant rate. After a short break, Joe travels 18 more miles at a rate that is 3 miles per hour less than the rate on the first part of the trip. The total time for the canoe trip (**excluding the break)** is 3 hours. If x represents the average speed for the first part of the trip, which **simplified equation** could be used to find x?

	Distance	Rate	Time
First part of Trip	42	x	
Second part of Trip	18		

A $x^2 - 3x + 20 = 0$

B $x^2 - 23x + 42 = 0$

C $x^2 - 17x - 42 = 0$

D $x^2 - 23x + 18 = 0$

E $x^2 - 20x + 15 = 0$

11) Find y' if $y = \dfrac{4x+11}{x^2-3}$

A $y' = \dfrac{-4x^2 + 22x + 12}{(x^2-3)^2}$

B $y' = \dfrac{4x^2 + 22x - 12}{(x^2-3)^2}$

C $y' = \dfrac{-4x^2 - 22x - 12}{(x^2-3)^2}$

D $y' = \dfrac{4x^2 + 22x + 12}{(x^2-3)^2}$

E $y' = \dfrac{4x^2 - 22x - 12}{(x^2-3)^2}$

12) Find this limit: $\lim\limits_{\Delta x \to 0} \left(\dfrac{1 + 2(x+\Delta x) - (x+\Delta x)^2 - (1 + 2x - x^2)}{\Delta x} \right)$

A. $2 - 2x$

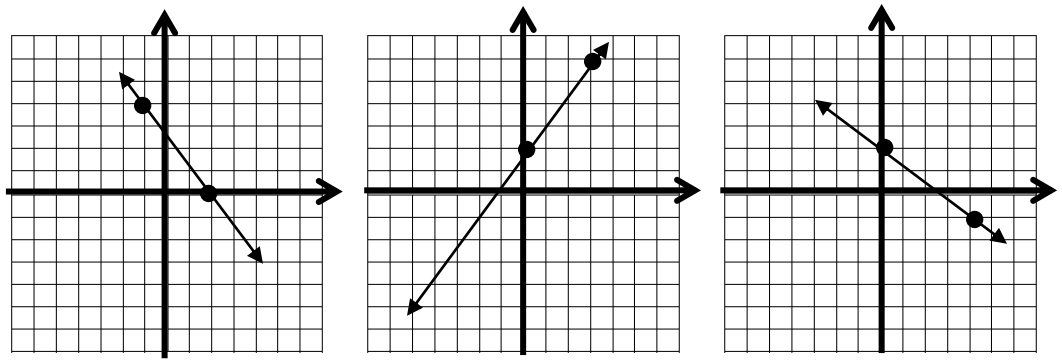
B. $-2 + 2x$

C. 2

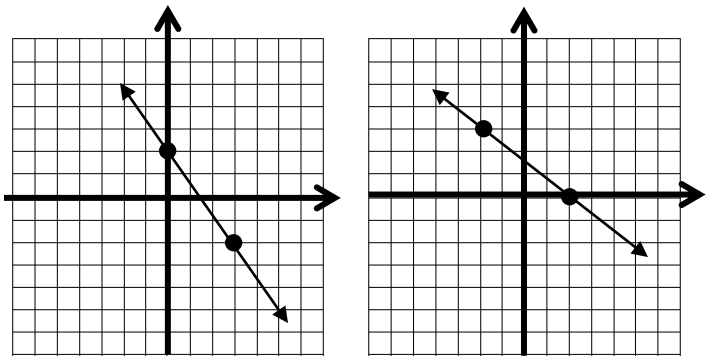
D. $2 + 2x$

E. $-2 - 2x$

13) Which best approximates the graph of the line with equation $y = -\frac{4}{3}x + 2$? (The axes are the bold lines with the arrows at one end. The scale used for each axis is 1 unit per hash mark.)



A *B* *C*



D *E*

14) Find the following limit. $\lim_{x\to 0}\left(\frac{\sqrt{x+1}-1}{x}\right)$

A. 0
B. $\frac{1}{2}$
C. 1
D. $\frac{1}{4}$
E. The limit does not exist.

15) Find the slope of the line tangent to the graph of $f(x) = 2x^2(5x^2 - 3x + 4)$ at the point $(-1,24)$.

A. -42
B. -26
C. -66
D. 52
E. -74