1)   Perform the operations.

$$\left[-(y^3 - y^2 + 3) - (2y^3 + 5y^2 - 7y)\right] + (4y^3 - 9y^2 - 6y + 2)$$

A. $5y^3 - 2y^2 - 13y - 1$

B. $y^3 - 13y^2 + y - 1$

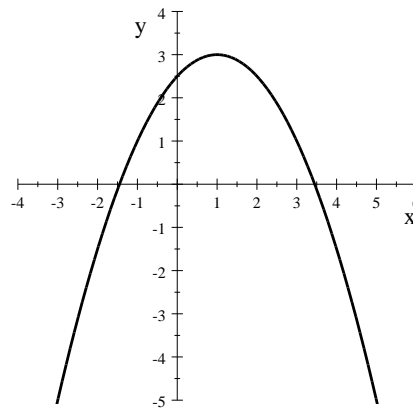C. $y^3 - 13y^2 - 13y - 1$

D. $y^3 - 3y^2 + y - 1$

E. $5y^3 - 3y^2 - 13y - 1$

2)   Which choice below does **not** represent y as a function of x?

A.   The set of ordered pairs (x, y) below …   B.   The graph below…

        $\{(5,1),\ (6,1),\ (-2,1),\ (0,1)\}$

C.   The equation below…   D.   The table below…

        $x = y^4$

x	2	0	5	1
y	1	5	0	2

E.   The mapping below…
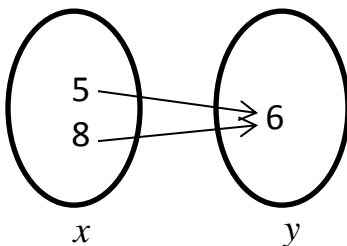
3)   Which function is matched with its correct domain?

A. $y = \sqrt{2-3x}$ $D = \left(-\infty, \frac{2}{3}\right]$

B. $y = \dfrac{3x-1}{x}$ $D = (-\infty, \infty)$

C. $y = x^2 - 4x + 4$ $D = (-\infty, 0) \cup (0, \infty)$

D. $y = \dfrac{5x-3}{2}$ $D = \left(-\infty, \frac{3}{5}\right) \cup \left(\frac{3}{5}, \infty\right)$

E. $y = \sqrt{x}$ $D = (0, \infty)$

4)   Which of the following statements in the box is/are true?

I	$(3-b^2)(3+b^2) = 9 - 2b^2$
II	$(2x+\pi)^2 = 4x^2 + 4\pi x + \pi^2$
III	$(3r^2 + 5s)(2r^2 - 5s) = 6r^4 - 5r^2 s - 25s^2$

A.   II only

B.   I and II only

C.   I and III only

D.   II and III only

E.   I, II, and III

5)   Find the area of the shaded region below as a polynomial. Note: Drawing may not be to scale.
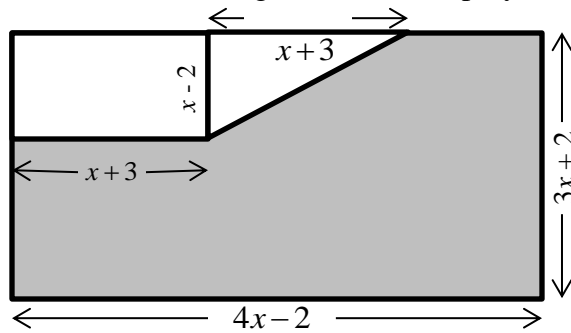
A.   area $= \dfrac{21}{2}x^2 + \dfrac{7}{2}x + 5$

B.   area $= \dfrac{21}{2}x^2 + \dfrac{7}{2}x - 13$

C.   area $= \dfrac{27}{2}x^2 + \dfrac{1}{2}x + 5$

D.   area $= \dfrac{27}{2}x^2 + \dfrac{7}{2}x - 13$

E.   area $= \dfrac{21}{2}x^2 + \dfrac{1}{2}x + 5$

6)   Solve the equation below and select the correct solution.

$$\frac{6}{2a-6} + \frac{3}{3a-3} = \frac{1}{a^2-4a+3}$$

A. $a = \dfrac{4}{7}$

B. $a = \dfrac{1}{4}$

C. $a = \dfrac{16}{9}$

D. $a = \dfrac{7}{4}$

E.   No solution.

7)   Solve the equation below and select the correct description of the solution.

$$\frac{5x+1}{7} = \frac{x+2}{14} + \frac{x-4}{7}$$

A. $x = -\dfrac{8}{7}$

B. $x = -\dfrac{1}{8}$

C. $x = -\dfrac{7}{8}$

D.   No solution.

E.   None of the above.

8)   Melissa can mow the community center's lawn in 5 hours using a push mower. Her father, Jim, can mow the lawn in 2 hours using a tractor mower. How long would it take them if they work together? Round your answer to the nearest tenth of an hour.

<div style="text-align:right">

A.   1.2 hours
B.   1.3 hours
C.   1.4 hours
D.   1.5 hours
E.   1.6 hours

</div>

9)   Ron leaves on a business trip at 8 AM traveling from Lafayette to Indianapolis (on I 65). **Fifteen minutes later**, his wife realizes he forgot his briefcase and cell phone, so she decides to give chase to catch up with him. Ron is averaging 56 miles per hour and his wife is averaging 68 miles per hour. Assume neither encounters traffic or road conditions that cause him/her to vary his/her rate of speed, how long will it take for Ron's wife to catch up with Ron? Let t represent the time for **Ron's wife**. Select the equation that could be used to find t.

	Distance	Rate	Time
Ron			
Wife			t

<div style="text-align:right">

A. $68t = 56(t-15)$
B. $68t = 56(t+15)$
C. $68\left(t+\frac{1}{4}\right) = 56t$
D. $68t = 56\left(t-\frac{1}{4}\right)$
E. $68t = 56\left(t+\frac{1}{4}\right)$

</div>

10) The quadratic equation $3x^2 - 4 = -4x$ has two solutions, one positive and one negative. Which statement below describes the <u>positive solution</u>?

    A.   It is between 0 and $1\frac{1}{4}$.

    B.   It is between $2\frac{3}{4}$ and 3.

    C.   It is between 3 and 5.

    D.   It is between $1\frac{1}{4}$ and $2\frac{3}{4}$.

    E.   It is greater than 5 .

11) Solve the equation. Write solution(s) in simplified form. $n^2 + 4n - 8 = 0$

    A. $n = -2 + 4\sqrt{3},\ -2 - 4\sqrt{3}$

    B. $n = -4 + 2\sqrt{3},\ -4 - 2\sqrt{3}$

    C. $n = -2 + 3\sqrt{2},\ -2 - 3\sqrt{2}$

    D. $n = -2 + 2\sqrt{3},\ -2 - 2\sqrt{3}$

    E.   None of the above.

12) At a point 30 meters from the base of a bell tower, the distance to the top of the tower is 2 meters more than twice the height of the tower. Which **simplified** equation could be used to find the height of the tower, if x represents that height? (Hint: Draw a picture.)

    A. $3x^2 + 8x - 896 = 0$

    B. $3x^2 - 8x - 896 = 0$

    C. $3x^2 + 8x - 904 = 0$

    D. $3x^2 - 8x + 896 = 0$

    E. $3x^2 + 8x + 904 = 0$

13) A garden measuring 15 meters by 11 meters is surrounded by a walkway of uniform width as shown below. If the area of the garden plus the area of the walkway is 285 square meters and x represents the width of the walkway, which **simplified equation** could be used to solve for x?
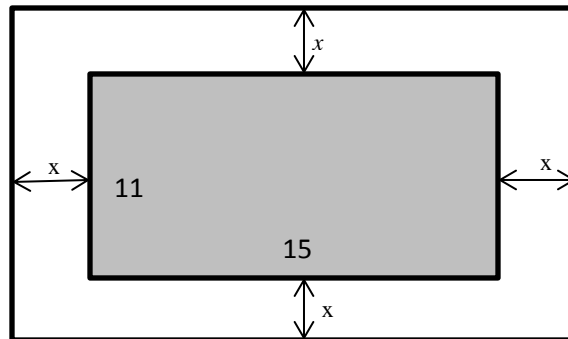
A. $x^2 + 13x - 30 = 0$

B. $x^2 + 26x - 120 = 0$

C. $2x^2 + 13x - 60 = 0$

D. $2x^2 + 13x - 30 = 0$

E. $4x^2 + 52x + 165 = 0$

14) Find the equation in slope-intercept form for the line with points $P(-2, -5)$ and $Q(6, -4)$.

A. $y = \dfrac{1}{8}x + \dfrac{19}{4}$

B. $y = -\dfrac{9}{4}x - \dfrac{19}{2}$

C. $y = \dfrac{1}{8}x + \dfrac{13}{4}$

D. $y = -\dfrac{9}{4}x + \dfrac{19}{2}$

E. $y = \dfrac{1}{8}x - \dfrac{19}{4}$

15)   Which equation would match the graph shown?
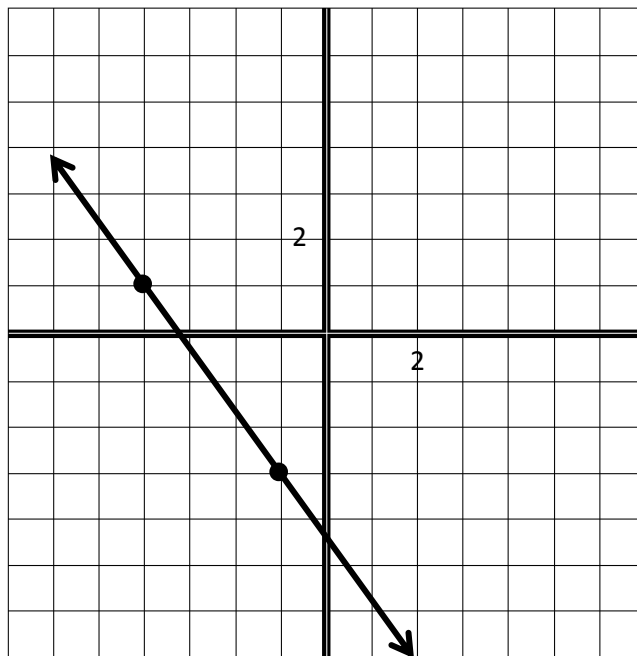
A. $4x - 3y = -13$

B. $3x + 4y = -13$

C. $3x - 4y = -13$

D. $4x + 3y = -13$

E.   None of the above.