

- 1) Which statement(s) in the box is(are) true? Examine statements closely.

I  $(3x+5)(3x-5) = 9x^2 - 25$   
 II  $(10y-4)(3y+2) = 30y^2 - 8y - 8$   
 III  $5a^2(6a^2 - 9a + 7) = 30a^4 - 45a^3 + 35a$

- A. II and III only  
 B. I only  
 C. I and II only  
 D. I, II, and III  
 E. I and III only

- 2) Find the domain for each function below.

$$f(x) = \sqrt{2-4x} \quad g(x) = \frac{2x}{x+5}$$

- A.  $f$  Domain =  $\left[\frac{1}{2}, \infty\right)$ ,  $g$  Domain =  $(-\infty, -5) \cup (-5, \infty)$   
 B.  $f$  Domain =  $\left[-\frac{1}{2}, \infty\right)$ ,  $g$  Domain =  $(-\infty, -5) \cup (-5, \infty)$   
 C.  $f$  Domain =  $\left(-\infty, \frac{1}{2}\right]$ ,  $g$  Domain =  $(-\infty, -5) \cup (-5, 0) \cup (0, \infty)$   
 D.  $f$  Domain =  $\left(-\infty, \frac{1}{2}\right]$ ,  $g$  Domain =  $(-\infty, -5) \cup (-5, \infty)$   
 E.  $f$  Domain =  $(-\infty, 2]$ ,  $g$  Domain =  $(-\infty, -5) \cup (-5, 0) \cup (0, \infty)$

- 3) Perform the operations and write as a simplified polynomial. Which choice is the answer?

$$3x(2x^2 - 5x + 1) - (6x^3 + 2x^2 - 7x - 2) + (5 - 6x^2 + 7x^3 + 9x)$$

- A. None of the polynomials below.  
 B.  $7x^3 - 19x^2 + 19x + 7$   
 C.  $7x^3 - 4x^2 - 3x + 4$   
 D.  $7x^3 - 23x^2 + 5x + 7$   
 E.  $7x^3 - 23x^2 + 19x + 7$

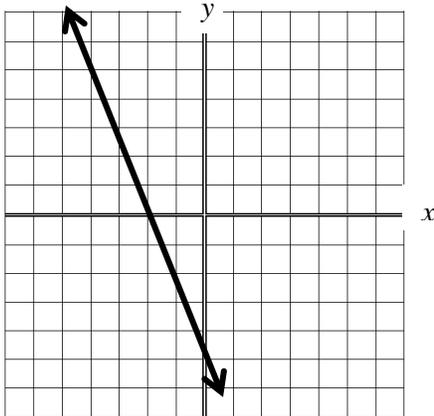
- 4) Given the function  $F$  below, find the value of  $F\left(\frac{2}{n}\right)$  if  $n \neq 2$

$$F(x) = \begin{cases} \frac{3x-1}{2-x} & \text{if } x \neq 1 \\ 4 & \text{if } x = 1 \end{cases}$$

- A.  $\frac{6-n}{2n-2}$
- B. 4
- C.  $\frac{6-n}{2n+2}$
- D.  $\frac{6+n}{2n-2}$
- E. None of the above.

- 5) Which choice below would **not** represent a function?

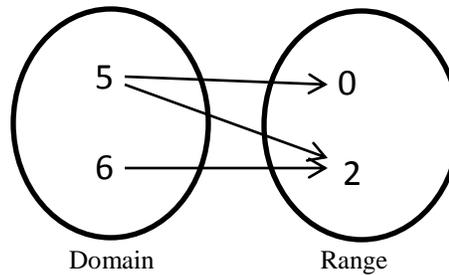
A. The line graphed below.



B. The ordered pairs in the table below.

$x$	$y$
2	5
3	5
4	5
5	5

C. The mapping below.



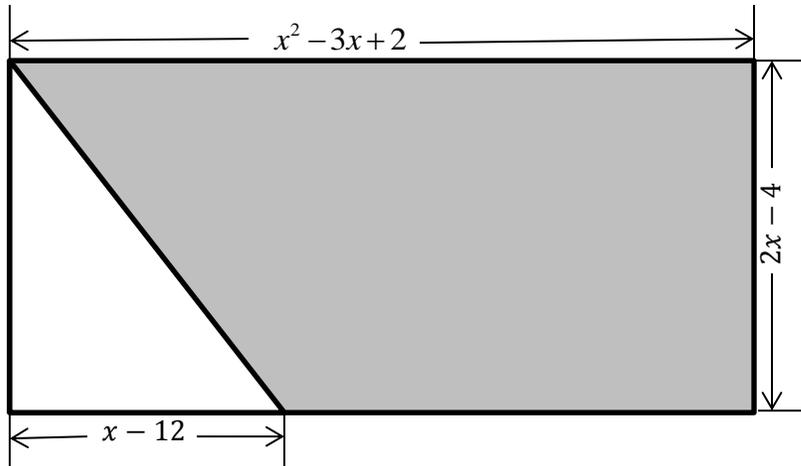
D.  $\{(x, y) | y = 3x^2 - 4x\}$

E.  $\{(2, 3), (-2, 3), (1, 5), (-1, 5)\}$

6)  $(3x-4y)^2 = ?$

- A.  $9x^2 - 12xy + 16y^2$   
 B.  $9x^2 + 24xy + 16y^2$   
 C.  $9x^2 - 24xy - 16y^2$   
 D.  $9x^2 + 16y^2$   
 E. None of the above.

7) Find a polynomial that would represent the shaded area in the rectangular figure below.



- A.  $2x^3 - 11x^2 + 30x - 32$   
 B.  $2x^3 - 9x^2 + 30x - 16$   
 C.  $2x^3 - 11x^2 + 4x - 16$   
 D.  $2x^3 - 9x^2 + 4x - 32$   
 E.  $2x^3 - 11x^2 + 30x - 16$

8) Solve the equation:  $\frac{3}{5}x - 2(x-3) = \frac{3}{2}x + \frac{9}{10}$

- A.  $x = -\frac{12}{29}$   
 B.  $x = \frac{51}{29}$   
 C.  $x = \frac{12}{29}$   
 D.  $x = -\frac{69}{29}$   
 E.  $x = -\frac{51}{29}$

- 9) Solve the equation:  $\frac{8}{a^2-4} + \frac{2a}{2a+4} = \frac{3a}{3a-6}$   
 Select the correct choice.

- A. Solution  $a$  is less than  $-3$ .  
 B. Solution  $a$  is between  $-3$  and  $0$ .  
 C. Solution  $a$  is between  $0$  and  $3$ .  
 D. Solution  $a$  is greater than  $3$ .  
 E. There is no solution.

- 10) A man leaves home driving at the rate of 50 miles per hour. When his daughter discovers that he has forgotten his wallet, she drives after him at the rate of 65 miles per hour. How long will it take her to catch her dad if he has a 15 minute head start? Convert your final answer to minutes, rounding to the nearest minute, if necessary.

	Distance	Rate	Time
Dad			
Daughter			

- A. 30 minutes  
 B. 40 minutes  
 C. 60 minutes  
 D. 50 minutes  
 E. 45 minutes

- 11) A garden hose can fill a swimming pool in 3 days, and a larger hose can fill the pool in 2 days. How long (in days) will it take to fill the pool if both hoses are used together?

- A.  $1\frac{1}{5}$  days
- B.  $\frac{4}{5}$  of a day
- C.  $1\frac{3}{5}$  days
- D.  $1\frac{2}{5}$  days
- E. 1 day

- 12) Solve using the quadratic formula:  $2x^2 + 8x = 7$   
Which choice is *one* of the solutions?

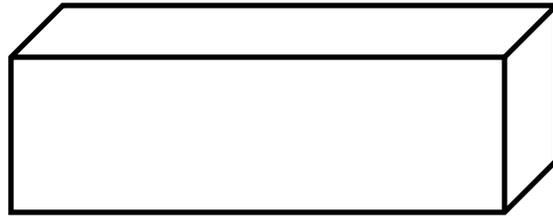
- A.  $x = 2 - \frac{\sqrt{2}}{2}$
- B.  $x = -2 - \frac{\sqrt{30}}{2}$
- C.  $x = -2 + \frac{\sqrt{2}}{2}$
- D.  $x = 2 + \frac{\sqrt{30}}{2}$
- E. There are no real solutions.

- 13) Solve the equation below and select the solutions.

$$(3n + 4)(n - 3) = 6n + 8$$

- A.  $n = \frac{4}{3}, -5$
- B.  $n = -\frac{4}{3}, 3$
- C.  $n = \frac{4}{3}, -3$
- D.  $x = -\frac{3}{4}, 5$
- E.  $x = -\frac{4}{3}, 5$

- 14) A rectangular piece of metal is 15 inches longer than it is wide. Square with sides 3 inches long are cut from the four corners and the flaps are folded upward and taped to form an open-topped box. If the volume of the box is 648 cubic inches, what was the original width (shorter side) of the piece of metal? (The pictures below may help you.)



- A. *width*: 10 inches
- B. *width*: 13 inches
- C. *width*: 14 inches
- D. *width*: 15 inches
- E. *width*: 18 inches

- 15) Lou, a mechanic from Lafayette Jiffy Lube, needs 20 Liters of a solution that is 60% antifreeze. Unfortunately, there are only 30% antifreeze and 70% antifreeze solutions available. Lou believes he can use his mathematics knowledge to determine how much of the 30% antifreeze and how much of the 70% antifreeze he needs to mix in order to get the desired strength of 60% antifreeze. If  $x$  represents the amount (in Liters) of 30% antifreeze, **which equation** could be used to solve for  $x$ ?

- A.  $0.3x + 0.7(20 - x) = 20$
- B.  $0.3x + 0.7(20 - x) = 0.6$
- C.  $0.3x + 0.7x = 0.6(20)$
- D.  $0.3x + 0.7(x - 20) = 12$
- E.  $0.3x + 0.7(20 - x) = 12$