

1. An expression is shown below:

$$3\sqrt{58x}$$

Which value of x makes the expression equivalent to $6\sqrt{29}$?

- A. 2
B. 3
C. 4
D. 9
2. Simplify: $4(3\sqrt{16})^{-1}$

- A. $\frac{1}{8}$
B. $\frac{1}{3}$
C. 48
D. 96

3. A polynomial expression is shown below.

$$(mx^4 - 3)(4x^2 - 3x + 4) - (12x^6 - 9x^5)$$

The expression is simplified to $12x^4 - 12x^2 + 9x - 12$. What is the value of m ?

- A. -12
B. -3
C. 3
D. 12
4. Which is a factor of the trinomial $x^2 - 5x + 6$?
- A. $(x - 1)$
B. $(x - 6)$
C. $(x - 3)$
D. $(x + 2)$

5. Simplify:

$$\frac{x^2 + x - 6}{x^2 - 5x + 6}; x \neq 2, 3$$

- A. $-\frac{1}{5}x - 1$
B. $x^2 - \frac{1}{5}x - 1$
C. -1
D. $\frac{x+3}{x-3}$

6. Anna burned 25 calories per minute running for x minutes and 15 calories per minute hiking for y minutes. She spent a total of 35 minutes running and hiking and burned 675 calories. The system of equations shown below can be used to determine how much time Anna spent on each exercise.

$$25x + 15y = 675$$

$$x + y = 35$$

What is the value of x , the minutes Anna spent running?

- A. 10
 - B. 15
 - C. 20
 - D. 25
7. Samantha and Maria purchased flowers. Samantha purchased 3 roses for x dollars each and 4 daisies for y dollars each and spent \$27 on the flowers. Maria purchased 2 roses for x dollars each and 5 daisies for y dollars each and spent \$25. The system of equations shown below represents this situation.

$$3x + 4y = 27$$

$$2x + 5y = 25$$

Which statement is true?

- A. A rose costs \$2 more than a daisy
 - B. Samantha spent \$5 on each daisy
 - C. Both girls spent more on daisies than they did on roses.
 - D. Samantha spent over 5 times as much on daisies as she did on roses.
8. A baseball team had \$1,500 to spend on supplies. The team spent \$255 on a new bat. New baseballs cost \$6 each. The inequality $255 + 6b \leq 1,500$ can be used to determine the number of new baseballs (b) that the team can purchase. Which statement about the number of new baseballs that can be purchased is true?
- A. The team can purchase 185 new baseballs.
 - B. The minimum number of new baseballs that can be purchased is 207.
 - C. The maximum number of new baseballs that can be purchased is 208.
 - D. The team can purchase 210 new baseballs, but this number is neither the maximum nor the minimum.

9. Tyreke always leaves a tip of between 10% and 25% for the server when he pays for his dinner. This can be represented by the system of inequalities shown below, where y is the amount of tip and x is the cost of dinner.

$$y > 0.1x$$

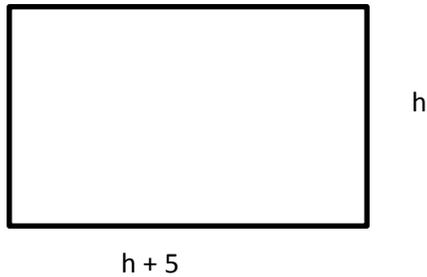
$$y < 0.25x$$

Which of the following is a true statement?

- A. When the cost of dinner (x) is \$10, the amount of tip (y) must be between \$1 and \$8.
- B. When the cost of dinner (x) is \$15, the amount of tip (y) must be between \$1.50 and \$3.75
- C. When the amount of tip (y) is \$3, the cost of dinner (x) must be between \$10 and \$30.
- D. When the amount of tip (y) is \$2.40, the cost of dinner (x) must be between \$3 and \$6.

Algebra 1 Keystone Open-ended questions

1. Keng creates a painting on a rectangular canvas with a width that is five inches longer than the height, as shown in the diagram below.



- A. Write a polynomial expression, in simplified form, that represents the area of the canvas.

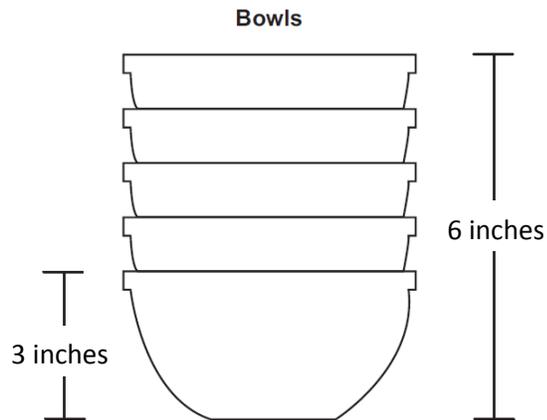
Keng adds a 2-inch-wide frame around all sides of his canvas.

- B. Write a polynomial expression, in simplified form, that represents the total area of the canvas and the frame.

Keng is unhappy with his 2-inch-wide frame, so he decides to put a frame with a different width around his canvas. The total area of the canvas and the new frame is given by the polynomial $h^2 + 17h + 66$, where h represents the height of the canvas.

- C. Determine the width of the new frame. Show all your work. Explain why you did each step.

2. The diagram below shows 5 identical bowls stacked one inside the other.



The height of 1 bowl is 3 inches. The height of a stack of 5 bowls is 6 inches.

- A. Write an equation using x and y to find the height of a stack of bowls based on any number of bowls.

- B. Describe what the x and y variable represent.

- C. What is the height, in inches, of a stack of 10 bowls?