1. An expression is shown below:

   $2\sqrt{51x}$

   Which value of x makes the expression equivalent to $10\sqrt{51}$?

   A. 5
   B. 25
   C. 50
   D. 100

2. Simplify: $2(2\sqrt{4})^{-2}$

   A. $\frac{1}{8}$
   B. $\frac{1}{4}$
   C. 16
   D. 32

3. A polynomial expression is shown below.

   $(mx^3 + 3)(2x^2 + 5x + 2) – (8x^5 + 20x^4)$

   The expression is simplified to $8x^3 + 6x^2 + 15x + 6$. What is the value of m?

   A. -8
   B. -4
   C. 4
   D. 8

4. Which is a factor of the trinomial $x^2 – 2x – 15$?

   A. (x – 13)
   B. (x – 5)
   C. (x + 5)
   D. (x + 13)

5. Simplify:

   $$\frac{x^2 - 3x - 10}{x^2 + 6x + 8}; x \neq -4, -2$$

   A. $-\frac{1}{2}x - \frac{5}{4}$
   B. $x^2 - \frac{1}{2}x - \frac{5}{4}$
   C. $\frac{x-5}{x+4}$
   D. $\frac{x+5}{x-4}$

6. Anna burned 15 calories per minute running for x minutes and 10 calories per minute hiking for y minutes. She spent a total of 60 minutes running and hiking and burned 700 calories. The system of equations shown below can be used to determine how much time Anna spent on each exercise.

   $15x + 10y = 700$

   $x + y = 60$

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

   A. 10
   B. 20
   C. 30
   D. 40

7. Samantha and Maria purchased flowers. Samantha purchased 5 roses for x dollars each and 4 daisies for y dollars each and spent $32 on the flowers. Maria purchased 1 rose for x dollars each and 6 daisies for y dollars each and spent $22. The system of equations shown below represents this situation.

   $5x + 4y = 32$

   $x + 6y = 22$

   Which statement is true?

   A. A rose costs $1 more than a daisy
   B. Samantha spent $4 on each daisy
   C. Samantha spent more on daisies than she did on roses.
   D. Samantha spent over 4 times as much on daisies as she did on roses.

8. A baseball team had $1,000 to spend on supplies. The team spent $185 on a new bat. New baseballs cost $4 each. The inequality $185 + 4b \leq 1{,}000$ 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 204 new baseballs.
   B. The minimum number of new baseballs than can be purchased is 185.
   C. The maximum number of new baseballs that can be purchased it 185.
   D. The team can purchase 185 new baseballs, but this number is neither the maximum nor the minimum.

9. Tyreke always leaves a tip of between 8% and 20% 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.

   $y > 0.08x$

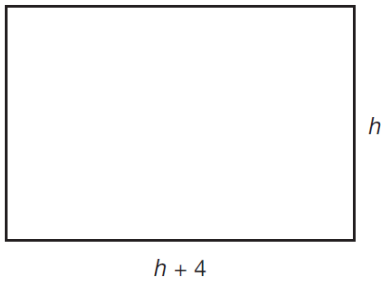
   $y < 0.2x$

   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 $2 and $8.
   B. When the cost of dinner (x) is $15, the amount of tip (y) must be between $1.20 and $3.00
   C. When the amount of tip (y) is $3, the cost of dinner (x) must be between $11 and $23.
   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 four 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.

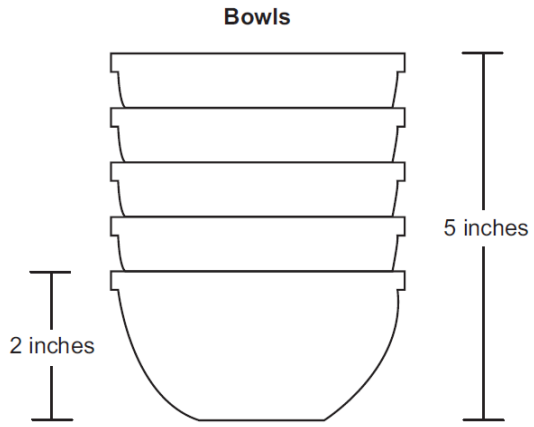
Keng adds a 3-inch-wide frame around all sides of his canvas.

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

Keng is unhappy with his 3-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 $h^2 + 8h + 12$, 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 2 inches. The height of a stack of 5 bowls is 5 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?