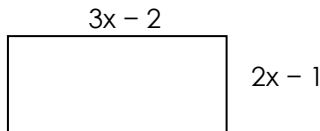


**Competency 1: Polynomial Expressions**

- Simplify the expression:  $-2x(x - 3)^2$
- The measurements of a photo frame are shown in the diagram. Write a polynomial expression that represents the width of the photo opening.



- Find the area of the rectangle below in terms of  $x$ . Simplify the expression.



- If each side is doubled, what is the area of the new rectangle in terms of  $x$ ? Simplify the expression.
- Use:  $12x^2 - 36x$ 
  - State the greatest common factor (GCF) of the polynomial.
  - Completely factor the polynomial.

5. Factor:  $81y^2 + 36y + 4$

**Competency 2: Solving Quadratics**

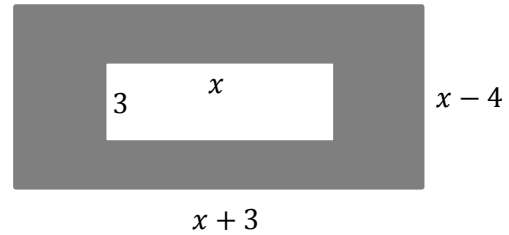
Solve problems 6-15. Choose one of the following methods to solve each problem: graphically (G), factoring (F), Completing the Square (CS), and Quadratic Formula (QF). You must use each method at least twice. State your chosen method next to each problem.

- $2x^2 + 3x - 12 = 8x$
- $x^2 = 2x + 6$
- $2.45x^2 + 1.5x = 3.5x^2$
- $0 = 4x^2 + 2x + 4$
- A company earns a weekly profit of  $P$  dollars by selling  $x$  items, according to the function  $P(x) = -0.5(x - 60)(x - 10)$ .
  - Determine the roots for  $P(x)$ .

Use the roots found in part (a) to determine:

  - axis of symmetry

- The height of a football that has been kicked can be described by the expression  $-16t^2 + 20t + 6$  where  $t$  is the time in seconds. At what time will the football hit the ground?
- Your family is designing a rectangular kiddie pool. The white rectangle represents the swimming pool & the deck is the shaded area surrounding the pool.



The area of the deck is 48 square feet. Determine the dimensions of the swimming pool.

- The hypotenuse of a right triangle is 20 cm. One of the legs is 4 cm longer than the other leg. Solve for  $x$  and find the perimeter of the triangle.
- Jamie's work for solving a quadratic equation is shown below. Jamie began with  $2x^2 - 3x + 16 = 0$ .

Step 1:  $x = \frac{3 \pm \sqrt{(-3)^2 - 4 \cdot 2 \cdot 16}}{2 \cdot 2}$

Step 2:  $x = \frac{3 \pm \sqrt{-9 - 128}}{4}$

Step 3:  $x = \frac{3 \pm \sqrt{-137}}{4}$

Step 4: *no real solutions*

- At which step did Jamie make a mistake?
  - Fix Jamie's error and correctly finish the problem.
- The manager of a dog park enclosed an area for small dogs to play. He made the length 15 feet longer than the width and enclosed a total area of 1350 square feet. What is the width of the play area? Round your answer to the nearest tenth if necessary.