

Bell Work:

1. $(4 - 7i) - (5 + 8i)$

2. $(4 - 7i)(5 + 8i)$

3. $\frac{4 - 7i}{5 + 8i}$

4. What is the equation for the linear parent function?

Find the roots of the quadratic function by completing the square.

$$f(x) = x^2 + 6x + 27$$

$$x^2 + 6x + 27 = 0$$

$$x^2 + 6x = -27$$

$$x^2 + 6x + 9 = -27 + 9$$

$$\sqrt{(x + 3)^2} = \sqrt{-18}$$

$$x + 3 = \pm \sqrt{18} i$$

$$x = -3 \pm 3\sqrt{2} i$$

1. *Set the function equal to 0.*
2. *Move the c to the other side.*
3. *Add the new c to both sides.*

$$c = \left(\frac{b}{2}\right)^2 = \left(\frac{6}{2}\right)^2 = (3)^2 = 9$$

4. *Factor the left side.*
5. *Square root both sides.*
6. *Simplify the imaginary number.*
7. *Solve for x.*

Find the roots of the quadratic function by completing the square.

$$f(x) = x^2 - 4x + 13$$

$$x^2 - 4x + 13 = 0$$

$$x^2 - 4x = -13$$

$$x^2 - 4x + 4 = -13 + 4$$

$$\sqrt{(x-2)^2} = \sqrt{-9}$$

$$x - 2 = \pm \sqrt{9} i$$

$$x = 2 \pm 3 i$$

1. *Set the function equal to 0.*
2. *Move the c to the other side.*
3. *Add the new c to both sides.*

$$c = \left(\frac{b}{2} \right)^2 = \left(\frac{-4}{2} \right)^2 = (-2)^2 = 4$$

4. *Factor the left side.*
5. *Square root both sides.*
6. *Simplify the imaginary number.*
7. *Solve for x.*

Find the roots of the quadratic function by completing the square.

$$f(x) = x^2 + 9x + 20$$

$$x^2 + 9x + 20 = 0$$

$$x^2 + 9x = -20$$

$$x^2 + 9x + 20.25 = -27 + 20.25$$

$$\sqrt{(x + 4.5)^2} = \sqrt{-6.75}$$

$$x + 4.5 = \pm \sqrt{6.75} i$$

$$x = -4.5 \pm \sqrt{6.75} i$$

1. *Set the function equal to 0.*
2. *Move the c to the other side.*
3. *Add the new c to both sides.*

$$c = \left(\frac{b}{2} \right)^2 = \left(\frac{9}{2} \right)^2 = (4.5)^2 = 20.25$$

4. *Factor the left side.*
5. *Square root both sides.*
6. *Simplify the imaginary number.*
7. *Solve for x.*

Find the roots of the quadratic function by completing the square.

$$f(x) = 2x^2 - 20x + 61$$

$$2x^2 - 20x + 61 = 0$$

$$2x^2 - 20x = -61$$

$$x^2 - 10x = -30.5$$

$$x^2 - 10x + 25 = -30.5 + 25$$

$$\sqrt{(x-5)^2} = \sqrt{-4.5}$$

$$x - 5 = \pm \sqrt{4.5} i$$

$$x = 5 \pm \sqrt{4.5} i$$

1. *Set the function equal to 0.*
2. *Move the c to the other side.*
3. *Divide by a.*
4. *Add the new c to both sides.*

$$c = \left(\frac{b}{2}\right)^2 = \left(\frac{-10}{2}\right)^2 = (5)^2 = 25$$

5. *Factor the left side.*
6. *Square root both sides.*
7. *Simplify the imaginary number.*
8. *Solve for x.*

Find the roots of the quadratic function by completing the square.

$$f(x) = 3x^2 + 36x + 123$$

$$3x^2 + 36x + 123 = 0$$

$$3x^2 + 36x = -123$$

$$x^2 + 12x = -41$$

$$x^2 + 12x + 36 = -41 + 36$$

$$\sqrt{(x + 6)^2} = \sqrt{-5}$$

$$x + 6 = \pm\sqrt{5}i$$

$$x = -6 \pm \sqrt{5}i$$

1. *Set the function equal to 0.*
2. *Move the c to the other side.*
3. *Divide by a.*
4. *Add the new c to both sides.*

$$c = \left(\frac{b}{2}\right)^2 = \left(\frac{-10}{2}\right)^2 = (5)^2 = 25$$

5. *Factor the left side.*
6. *Square root both sides.*
7. *Simplify the imaginary number.*
8. *Solve for x.*

Assignment:

**Finding the Roots by Completing the
Square C Worksheet**