

Station #1:

1. Left 4
Down 4

2. $y = -2(x-2)^2 + 10$

reflection
narrower
right 2
up 10

3. $y = x^2 - 4$
 $x = \frac{-b}{2a} = 0$

A.O.S = 0
Min
Domain: \mathbb{R}
Vertex: (0, 4)
Range: $y \geq 4$

4. $y = (2x-1)(2x-1)$
 $y = 4x^2 - 2x - 2x + 1$
 $y = 4x^2 - 4x + 1$
 $x = \frac{4}{2(4)} = \frac{4}{8} = \frac{1}{2}$

* A.O.S = $\frac{1}{2}$

* Min

* Domain: \mathbb{R}

* Vertex: $4\left(\frac{1}{2}\right)^2 - 4\left(\frac{1}{2}\right) + 1$
(1/2, 0) $1 - 2 + 1 = 0$

5. $y = 3(x+1)^2 - 5$
 $y = 3(x+1)(x+1) - 5$
 $(3x+3)(x+1) - 5$
 $3x^2 + 3x + 3x + 3 - 5$

$y = 3x^2 + 6x - 2$

Range: $y \geq 0$

Station #2

$$1. \quad x = \frac{-b}{2a} = -3$$

$$\begin{aligned} y &= (-3)^2 + 6(-3) + 9 \\ &= 9 - 18 + 9 \\ &= 0 \end{aligned}$$

Vertex: $(-3, 0)$
min
Domain: \mathbb{R}
Range: $y \geq 0$
A.O.S: $x = -3$

$$2. \quad x = \frac{+3}{2(-1)} = -1.5$$

$$\begin{aligned} y &= (-1.5)^2 - 3(-1.5) + 6 \\ y &= 8.25 \end{aligned}$$

A.O.S = $x = -1.5$
Vertex: $(-1.5, 8.25)$
max
Domain: \mathbb{R}
Range: $y \leq 8.25$

$$3. \quad x = \frac{4}{2(2)} = 1$$

$$\begin{aligned} y &= 2(1)^2 - 4(1) + 6 \\ &= 2 - 4 + 6 \\ &= 4 \end{aligned}$$

A.O.S = $x = 1$
Vertex: $(1, 4)$
Domain: \mathbb{R}
y-intercept: $(0, 6)$

$$4. \quad x = \frac{-b}{2a} = \frac{0}{2(-5)} = 0$$

Station #3: Factoring

1. $(x+5)(x+2)$ X-Factor

2. $-x^2 + 11x - 18$
 $x^2 + 11x + 18$ S-S-D

$$\begin{array}{r} 18 \\ \diagdown \quad \diagup \\ 9 \quad 2 \\ \diagup \quad \diagdown \\ 11 \end{array}$$

$$\begin{array}{c} (x+9)(x-2) \\ \text{or} \\ (-x+2)(x-9) \end{array}$$

3. $16x^2 - 80x + 100$
 $4(4x^2 - 20x + 25)$
 $4(x^2 - 20x + 100)$ GCF $\begin{array}{r} 100 \\ \diagdown \quad \diagup \\ -40 \quad -10 \\ \diagup \quad \diagdown \\ -20 \end{array}$ $4(x - \frac{5}{2})(x - \frac{5}{2})$
 $4(2x-5)(2x-5)$

4. $9x^2 - 36$ Difference of Squares
 $(3x-6)(3x+6)$

5. Don't worry about this one!

Station #4

1. $(x+4)(x+2)=0$

$$x+4=0$$

$$x = -4$$

$$x+2=0$$

$$x = -2$$

2. $2x^2 - 8x = 0$

$$2x(x-4) = 0$$

$$2x = 0 \quad x - 4 = 0$$

$$x = 0$$

$$x = 4$$

3. $2x^2 + 6x + 4 = 0$

$$2(x^2 + 3x + 2) = 0$$

$$(x+2)(x+1) = 0$$

$$x+2=0 \quad x+1=0$$

$$x = -2$$

$$x = -1$$

4. $3x^2 - 5x - 4 = 0$

$$x = -0.59$$

$$x = 2.26$$

5. $x^2 - 4x - 8 = 0$

$$x = -1.46$$

$$x = 5.46$$

Station #5

$$x^2 + (a-x)b = 0$$

$$x = \frac{b}{(1)} = x$$

1. $x^2 + 10x = 1$

$$x^2 + 10x + \left(\frac{+10}{2}\right)^2 = 1 + \left(\frac{+10}{2}\right)^2$$

$$x^2 + 10x + 25 = 1 + 25$$

$$(x+5)(x+5) = 26$$

$$\sqrt{(x+5)^2} = \sqrt{26}$$

$$x+5 = \pm 5.1$$

$$x+5 = 5.1$$

$$x = -0.1$$

$$x+5 = -5.1$$

$$x = +0.1$$

$$x^2 - 5(x-5) = 0$$

2. $x^2 + 2x = 7$

$$x^2 + 2x + \left(\frac{2}{2}\right)^2 = 7 + \left(\frac{2}{2}\right)^2$$

$$x^2 + 2x + 1 = 7 + 1$$

$$\sqrt{(x+1)^2} = \sqrt{8}$$

$$x+1 = \pm 2.8$$

$$x+1 = 2.8$$

$$x = 1.8$$

$$x+1 = -2.8$$

$$x = -3.8$$

$$x^2 - 58 = 0$$

3. $x^2 - 6x - 10 = 0$

$$x^2 - 6x = 10$$

$$x^2 - 6x + \left(\frac{-6}{2}\right)^2 = 10 + \left(\frac{-6}{2}\right)^2$$

$$x^2 - 6x + 9 = 10 + 9$$

$$(x-3)(x-3) = 19$$

$$\sqrt{(x-3)^2} = \sqrt{19}$$

$$x-3 = \pm 4.4$$

$$x-3 = 4.4$$

$$x = 7.4$$

$$x-3 = -4.4$$

$$x = -1.4$$

$$4. \quad x = \frac{6}{2(1)} = 3$$

$$y = a(x-h)^2 + k$$

$$y = (3)^2 - 6(3) + 4 + 1 = 9 - 18 + 4 + 1 = -5$$

vertex: (3, -5)

$$y = 1(x-3)^2 - 5$$

$$5. \quad \sqrt{\left(\frac{b}{2}\right)^2} = \sqrt{196}$$

$$\frac{b}{2} = 14$$

$$b = 28$$

$$\left(\frac{b}{2}\right)^2 = \left(\frac{b}{2}\right)^2 + x^2 + 5^2$$

$$14^2 = \left(\frac{b}{2}\right)^2 + x^2 + 5^2$$

$$8.5 = \frac{b}{2} + x$$

$$8.5 - 5 = 14 + x$$

$$3.5 = x$$

$$8.5 = 14 + x$$

$$8.5 - 14 = x$$

$$0 = 01 - x01 - 5^2 x$$

$$01 = x01 - 5^2 x$$

$$\left(\frac{b}{2}\right)^2 + 01 = \left(\frac{b}{2}\right)^2 + x01 - 5^2 x$$

$$p + 01 = p + x01 - 5^2 x$$

$$p1 = (5^2 x)(5 - x)$$

$$p1 = 5^2 (5 - x)^2$$

$$p \cdot 4 = 5^2 x$$

$$4 \cdot 4 = 5^2 x$$

$$16 = 25x$$

$$p \cdot 4 = 5^2 x$$

$$4 \cdot 4 = 25x$$

Station 6

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. $a=1$
 $b=-8$
 $c=15$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(1)(15)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{4}}{2}$$

$$x = \frac{8+2}{2}$$

$$x = \frac{8-2}{2}$$

$$x = \frac{8 \pm 2}{2}$$

$$x = \frac{10}{2}$$

$$x = \frac{6}{2}$$

$$x = 5$$

$$x = 3$$

2. $2x^2 - 7x + 3 = 0$

$a=2$
 $b=-7$
 $c=3$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(2)(3)}}{2(2)}$$

$$x = \frac{7 \pm 5}{4}$$

$$x = \frac{7 \pm \sqrt{49 - 24}}{4}$$

$$x = \frac{7+5}{4}$$

$$x = \frac{7-5}{4}$$

$$x = \frac{7 \pm \sqrt{25}}{4}$$

$$x = \frac{12}{4}$$

$$x = \frac{2}{4}$$

Discriminant: $b^2 - 4ac$

$$x = 3$$

$$x = 1/2$$

3. $-3x^2 + 5x + 1$

$a=-3$
 $b=5$
 $c=1$
 $(5)^2 - 4(-3)(1)$
 $25 + 12$
 $= 37$

2 real roots

4. $4x^2 + 4x + 1 = 0$

$a=4$
 $b=4$
 $c=1$
 $(4)^2 - 4(4)(1)$
 $16 - 16$
 $= 0$

1 real root