Station 1

1. Write an equation of a parabola that passes through (6, 35) and has vertex (-1, 14)
   * in vertex form.
2) Write an equation of the parabola whose x-intercepts are 12 and -6 and passes through (14, 4) in intercept form.
3) Write in standard form

a.) \( y = -4(x - 3)^2 + 7 \)

b.) \( y = \frac{1}{2}(x - 6)(x + 2) \)
Station 4

4.) Identify the focus, directrix and axis of symmetry.

a.) $x = \frac{1}{24} y^2$

b.) $6x^2 + 3y = 0$
5) Write an equation of the parabola shown.

a) Focus: (3, 0)
   Directrix: \( x = -3 \)
Station 6

6. Identify the vertex, focus, directrix and axis of symmetry

a) \( y = \frac{1}{8} (x - 3)^2 + 2 \)

b) \( x = -3(y + 4)^2 + 2 \)
7. Graph the quadratic inequality

a.) \( y < -x^2 + 4 \)

b.) \( y > -\frac{1}{2}(x+3)^2 + 2 \)
8.) The path of a placekicked football can be modeled by the function
\[ y = -0.026x(x - 46) \] where \( x \) is the horizontal distance (in yards) and \( y \) is the corresponding height (in yards).

a.) How far is the football kicked?

b.) What is the football's maximum height?
Station 1

1) \( y = \frac{3}{7} (x+1)^2 + 14 \)

Station 2

a) \( y = -\frac{1}{10} (x-12)(x+6) \)

Station 3

3) a) \( y = -4x^2 + 24x - 29 \)
b) \( y = \frac{1}{2}x^2 - 2x - 6 \)

Station 4

4) a) Focus \((b, 0)\)

Directrix \(x = b\)

Axis of symmetry \(y = 0\)

b) Focus \((0, -\frac{1}{8})\)

Directrix \(y = \frac{1}{8}\)

Axis of symmetry \(x = 0\)

Station 5

5) a) \( y = \frac{1}{32}x^2 \)

b) \( x = \frac{1}{12}y^2 \)

Station 6

6) a) Vertex \((3, 2)\)

Focus \((3, 4)\)

Directrix \(y = 0\)

Axis of symmetry \(x = 3\)

Station 7

7) a) \( y < -x^2 + 4 \)

Station 8

8) a) 400 yds

b) 13.75 yds

Station 9

Vertex: \((-3, 1)\)

\( y > -\frac{1}{2}(x+3)^2 + 2 \)
1. \( x, y \)  
\( (6, 35), (-1, 14) \)

\[ 35 = a(x+1)^2 + 14 \]
\[ 35 = a(7)^2 + 14 \]
\[ 35 = 49a + 14 \]
\[ 49a = 21 \]
\[ a = \frac{21}{49} \]
\[ a = \frac{3}{7} \]

2. \( P \) \( (12, 0) \) \( (-6, 0) \) \( (14, y) \)

\[ 0 = a(14-12)(14+6) \]
\[ 0 = a(-2)(20) \]
\[ 0 = a(-40) \]
\[ a = \frac{4}{40} \]
\[ a = \frac{1}{10} \]

3.

a.) \[ y = -4(x-3)(x-3) + 7 \]
\[ y = -4(x^2 - 6x + 9) + 7 \]
\[ y = -4x^2 + 24x - 36 + 7 \]
\[ y = -4x^2 + 24x - 29 \]

b.) \[ y = \frac{1}{2}(x-6)(x+2) \]
\[ y = \frac{1}{2}(x^2 + 2x - 6x - 12) \]
\[ y = \frac{1}{2}(x^2 - 4x - 12) \]
\[ y = \frac{1}{2}x^2 - 2x - 6 \]
4.

a.) \( x = \frac{1}{24} y^2 \)
\[ 4p = 24 \]
\[ p = 6 \]

**Focus:** \((0, 0)\)
**Directrix:** \(x = -6\)
**Axis of Symmetry:** \(y = 0\).

b.) \(6x^2 + 3y = 0\)
\[ 3y = -6x^2 \]
\[ y = -2x^2 \]
\[ \frac{1}{4p} \leq \frac{-2}{-2} \]
\[ -8p = 1 \]
\[ p = -\frac{1}{8} \]

**Focus:** \((0, -\frac{1}{8})\)
**Directrix:** \(y = \frac{1}{8}\)
**AOS:** \(x = 0\).

5.

a.) Vertex: \((0, 0)\)
**Directrix:** \(y = -8\)

So... **Focus:** \((0, 8)\)
\[ p = 8 \]
\[ y = \frac{1}{4(8)} x^2 \]
\[ y = \frac{1}{32} x^2 \]

b.) **Focus:** \((3, 0)\)
**Directrix:** \(x = -3\)

**Vertex:** \((0, 0)\)
\[ p = 3 \]
\[ x = \frac{1}{4(3)} y^2 \]
\[ x = \frac{1}{12} y^2 \]
* Formulas

\[ y = \frac{1}{4p} x^2 \]

\[ y = \frac{1}{4p} (x - k)^2 \quad \text{Vertex form!} \]

\[ y = \frac{1}{4p} (x-h)^2 + k \Rightarrow \text{vertex (h, k)} \]

Not squared so... Focus: \( (h, k+p) \) add first for Focus

Work with y space for \( \uparrow \)

Use opposite (not squared for \( \uparrow \))

\[ \chi = \frac{1}{4p} y^2 \]

\[ \chi = \frac{1}{4p} (y - k)^2 \quad \text{Vertex form but flip h, k} \]

\[ \chi = \frac{1}{4p} (y - k)^2 + h \Rightarrow \text{Vertex: (h, k)} \quad \text{Still in this order!} \]

↑ Not squared so work with x space for \( \uparrow \)

Focus: \( (h+p, k) \) *this time use \( \text{h+p and k} \)

Use opposite \( \uparrow \) for \( \Rightarrow \text{Directrix: } y = h - p \)
6. a) \( y = \frac{1}{8}(x-3)^2 + 2 \) 
\[ 4p = 8 \quad \text{vertex} \ (3,2) \]
\[ p = 2 \quad h = 3 \quad k = 2 \]
Focus: \((h, k+p)\) D: \(y = k-p\)
\[ k+p = 2+2 = 4 \]
\[ k-p = 2-2 = 0 \]

Vertex: \((3,2)\)
Focus: \((3,4)\)
Direct: \(y = 0\)
AOSE: \(x = 3\) 
\[ \Rightarrow "x" \ \text{of vertex or} \ x=h \]

b) \( x = -3(y+4)^2 + 2 \)
\[ \frac{1}{4p} = -3 \quad \text{vertex} \ (2, -4) \]
\[ 4p = -\frac{1}{12} \quad h = 2 \quad k = -4 \]
Focus: \((h+p, k)\) D: \(x = h-p\)
\[ x = \frac{23}{12} \]
D: \(x + \frac{1}{12} = \frac{23}{12} \)

7. See "answer sheet"

8. a) \( y = -0.026(x)(x-46) \)
\[ y = -0.026(x)(x-46) \]

\(x\) intercepts: \((0,0)\) \((46,0)\)

\[ \frac{46 \text{yds}}{} \]

b) \( \frac{0+46}{2} = 23 \)
\[ y = -0.026(23)(23-46) \]
\[ y = -0.026(23)(-23) \]
\[ y = 13.754 \]
\[ 13.754 \text{yds} \]