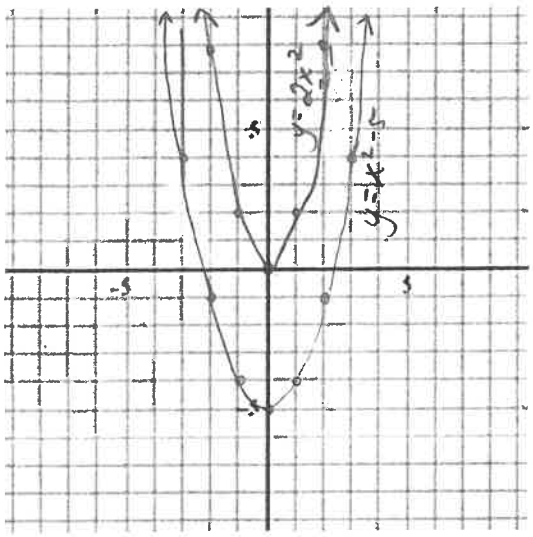
PREC11 /22 Name Key

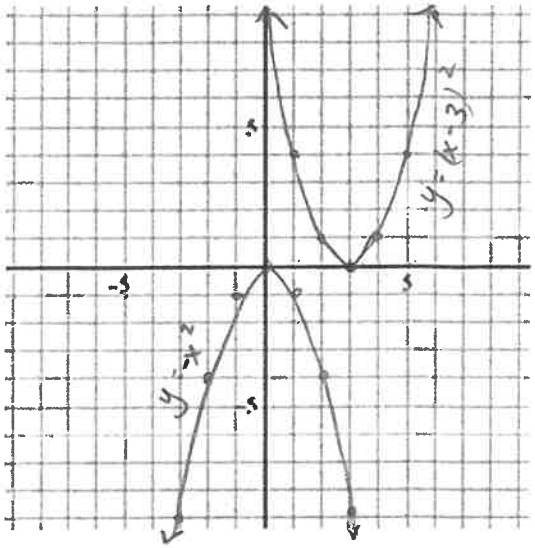
Quiz3.1(S)

Clearly show all work when needed.

1. Sketch and label each quadratic function on the grids provided (2 per grid). (1 mark each)

a) $y = x^2 - 5$ b) $y = 2x^2$ c) $y = (x-3)^2$ d) $y = -x^2$

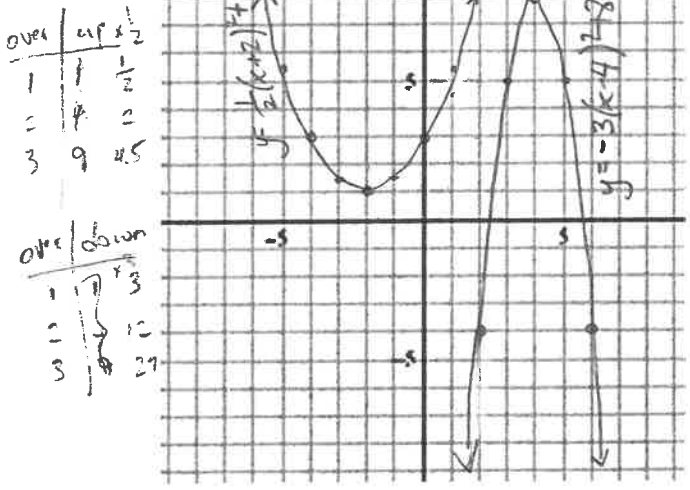




2. Sketch and label each quadratic function on the grids provided (2 per grid). (2 marks each)

a) $y = \frac{1}{2}(x+2)^2 + 1$

b) $y = -3(x-4)^2 + 8$



3. Describe how the graph of $y = x^2$ would be transformed to produce the graph of $y = -\frac{1}{4}(x+3)^2 - 5$. (2 marks)

Translation 3 units left and 5 units down. Compression of $\frac{1}{4}$ and a reflection over (in) the x-axis (opens down).

4. Given the quadratic function $y = \frac{5}{2}(x-3)^2 + 2$ state each of the following: (1 mark each)

Vertex: (3, 2) Domain: $x \in \mathbb{R}$

Axis of Symmetry: $x = 3$ Range: $y \geq 2$

14

5. Write the equation of the quadratic function in vertex form from the given information: (2 marks each)

a) Vertex $(-3, 0)$ and passing through the point $(-5, -8)$.

$y = a(x-p)^2 + q$

$-8 = a(-5--3)^2 + 0$

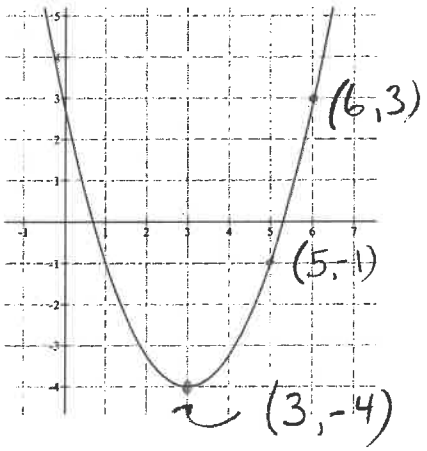
$-8 = a(-2)^2$

$-8 = a(4)$

$-2 = a$

$y = -2(x+3)^2$

b)



$y = a(x-p)^2 + q$

$-1 = a(5-3)^2 - 4$

$-1 = a(2)^2 - 4$

$-1 = 4a - 4$

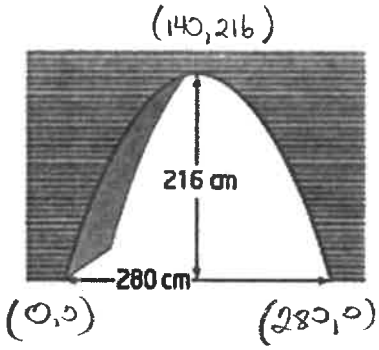
$3 = 4a$

$\frac{3}{4} = a$

$y = \frac{3}{4}(x-3)^2 - 4$

6. Suppose a parabolic archway has a width of 280 cm and a height of 216 cm at its highest point above the floor.

a) Write a quadratic function in vertex form to model this archway. (2 marks)



$0 = a(0-140)^2 + 216$

$-216 = a(-140)^2$

$-216 = a(19600)$

$\frac{-27}{2450} = a$

$y = \frac{-27}{2450}(x-140)^2 + 216$

b) Determine the height of the archway, to the nearest tenth, at the point that is 50 cm from its outer edge. (2 marks)

$(50, 0)$

$h = \frac{-27}{2450}(50-140)^2 + 216$

$h = 126.7\text{cm}$

5. Write the equation of the quadratic function in vertex form from the given information: (2 marks each)

a) Vertex $(-3, 0)$ and passing through the point $(-5, -8)$.

$y = f(x) = a(x+3)^2$

$-8 = a(-5+3)^2$

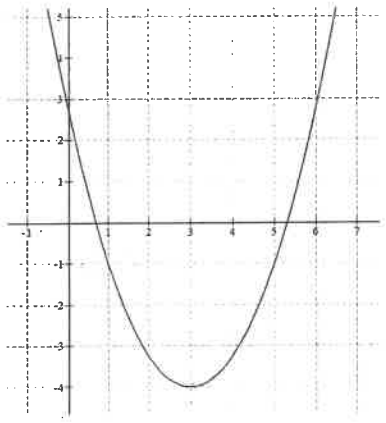
$-8 = 4a$

$-2 = a$

$f(x) = -2(x+3)^2$

/2

b)



(1, -1)

(3, -4)

$-1 = a(1-3)^2 - 4$

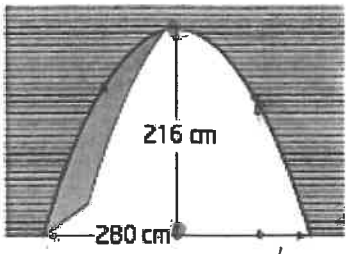
$3 = 4a$

$\frac{3}{4} = a$

$f(x) = \frac{3}{4}(x-3)^2 - 4$

/2

6. Suppose a parabolic archway has a width of 280 cm and a height of 216 cm at its highest point above the floor.



(140, 0)

a) Write a quadratic function in vertex form to model this archway. (2 marks)

↳ (0, 216)

/2

$0 = a(140 - 0)^2 + 216$

$-216 = a(140^2)$

$\frac{-216}{19600} = a\,19600$

$\frac{-27}{2450} = a$

$y = \frac{-27}{2450}(x-0)^2 + 216$

Optional

b) Determine the height of the archway, to the nearest tenth, at the point that is 50 cm from its outer edge. (2 marks)

140 - 50 = 90

/2

$h(x) =$

$h(90) = \frac{-27}{2450}(90)^2 + 216$

$h(90) = 126.7\text{cm}$

/8