Name: ________________________ Date: ______________

# Unit 5: Vertex Form of a Quadratic Relation–Quiz #13

| | | |
|---|---|---|
| VF1 | I can identify the vertex and axis of symmetry and explain the roles of a, h, and k as transformations applied to the base curve $y = x^2$ to create $y = a(x - h)^2 + k$. | /11 |

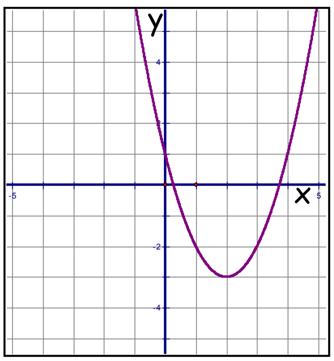
1. Match each equation with the correct graph. **(4 marks)**

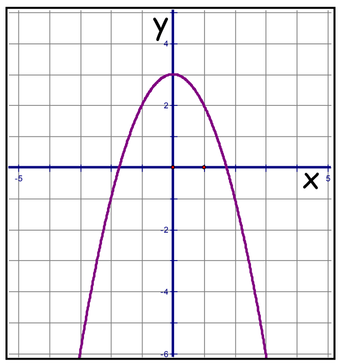
   A. $y = -x^2 + 3$ Vertex (0, 3)

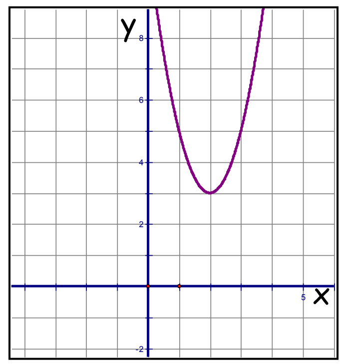
   B. $y = 2(x - 2)^2 + 3$ opens up Vertex (2, 3)

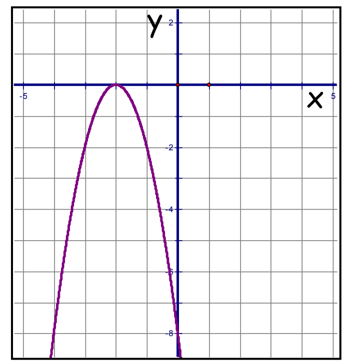
   C. $y = -2(x + 2)^2$ opens down Vertex (-2, 0)

   D. $y = (x - 2)^2 - 3$ Vertex (2, -3)




| | | | |
|---|---|---|---|
| EQUATION: d $y = (x-2)^2 - 3$ | EQUATION: A $y = -x^2 + 3$ | EQUATION: B $y = 2(x-2)^2 + 3$ | EQUATION: C $y = -2(x+2)^2$ |

2. List the transformations in the order you would apply them to the graph of $y = x^2$ to obtain the given quadratic relation. **(7 marks)**

Order
1. Stretch/Comp.
2. Reflections
3. Translations

A. $y = (x - 3)^2 + 11$

1. Translated 3 units right
2. Translated 11 units up

B. $y = -\frac{3}{4}x^2 - 2$

1. Vertical compression factor of 3/4
2. Reflected in the x-axis
3. Translated 2 units down.

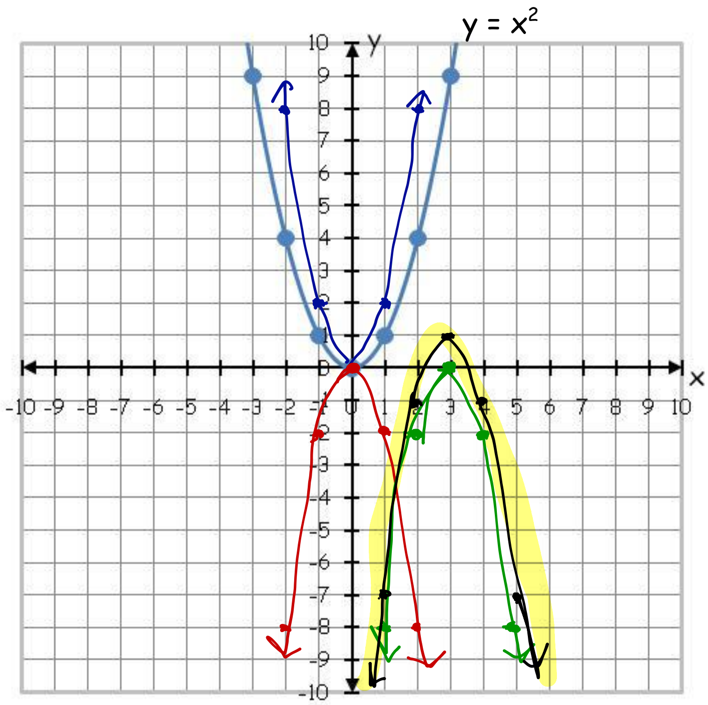
C. $y = 5(x + 7)^2$

1. Vertical stretch by a factor of 5
2. Translated 7 units to the left.

Name: ___________________________ Date: _______________

| VF2 | I can sketch the graph of $y = a(x - h)^2 + k$ by applying transformations to the graph $y = x^2$. | /4 |
|---|---|---|

3. Sketch the graph of the quadratic relation $y = -2(x - 3)^2 + 1$ by applying the appropriate transformations in the correct order. **(4 marks)**




① Vertical stretch by a factor of 2.

② Reflected in x-axis

③ Translated 3 units right

④ Translated 1 unit up

Vertex (3,1)

- factored Form $y = a(x-r)(x-s)$

A.O.S.

$$x = \frac{r+s}{2}$$

- Partial factoring

$$y = x^2 + 5x + 8$$

$\boxed{\text{Let } y = 8}$

$$8 = x^2 + 5x + 8$$

$$8 - 8 = x^2 + 5x + 8 - 8$$

$$0 = x^2 + 5x$$

$$0 = x(x+5)$$

$x = 0$ $\quad$ $x + 5 = 0$

$x = -5$

A.O.S.

$$x = \frac{0 + (-5)}{2}$$

$$x = -5/2$$

$$x = -2.5$$

$\therefore$ $(0, 8)$ & $(-5, 8)$ are 2 pts. on the parabola

Pg. 294 #11

Revenue questions

Revenue = (# of items sold)(selling price)

= (300)($5)

= $1500

Step 1 Let $x$ represent the # of price increases

Step 2

Selling Price = $5 + $0.50$x$

# of Items Sold = $300 - 30x$

Step 3 Revenue = $(300-30x)(5+0.5x)$

## Step 4 Find the zeros

$$R = (300 - 30x)(5 + 0.5x)$$

$$0 = (300 - 30x)(5 + 0.5x)$$

$$300 - 30x = 0$$
$$300 = 30x$$
$$\frac{300}{30} = x$$
$$10 = x$$

$$5 + 0.5x = 0$$
$$0.5x = -5$$
$$x = \frac{-5}{0.5}$$
$$x = -10$$

A.o.s. $x = \frac{10 + (-10)}{2}$

$= \frac{0}{2}$

$x = 0$

don't change the price

Pg. 302 # 13

$P = -30t^2 + 450t - 790$

t is ticket price

A.O.S.

$P = -790$

Patial Factoring

$-790 = -30t^2 + 450t - 790$

$-790 + 790 = -30t^2 + 450t - 790 + 790$

$0 = -30t^2 + 450t$

$= -30t(t - 15)$

$-30t = 0 \qquad t - 15 = 0$

$t = 0 \qquad t = 15$

A.O.S.

$$t = \frac{0 + 15}{2}$$

$$t = 7.5$$

$\therefore$ A ticket price of \$7.50 will maximize the profit.

# Quick Review

3 forms of a Quadratic Relation

| | | Info Given |
|---|---|---|
| Standard Form: | $y = ax^2 + bx + c$ | c is y-Int. |
| Factored Form: | $y = a(x-r)(x-s)$ | zeros are r & s |
| Vertex Form: | $y = a(x-h)^2 + k$ | Vertex is $(h, k)$ |

In all forms 'a' tells us:

- if there is a stretch or compression
- if a is (−) opens down
- if a is (+) opens up.

Axis of symmetry:

- x coordinate of the vertex (h in vertex form)
- vertical line that splits the parabola in half