

Are there any questions from last day's assigned work you would like to see on the board?

pp. 70-73 #6bc, 7c, (8,9)ac, 10, 12, 16, 18 [20, 22]
+3 Questions $\xrightarrow{(b) c}$

Not corrected yet.

Inverse Funcns: pp. 46-49 #2 – 4, (5 – 7)ace, 12 [19, 20]

4b

5e

p. 46

4. For each linear function, interchange x and y . Then solve for y to determine the inverse.

a) $y = 4x - 3$

c) $3x + 4y = 6$

b) $y = 2 - \frac{1}{2}x$

d) $2y - 10 = 5x$

$$x = 2 - \frac{1}{2}y$$

$$\begin{aligned} \frac{1}{2}y &= -x + 2 & \rightarrow y &= 2(-x+2) \\ 2\left(\frac{1}{2}y\right) &= 2(-x)+2(2) & &= 2(-(x-2)) \\ y &= -2x+4 & f^{-1}(x) &= 2(-(x-2)) \end{aligned}$$

5. Determine the inverse of each linear function by reversing the operations.

a) $f(x) = x - 4$

c) $f(x) = 5x$

e) $f(x) = 6 - 5x$

b) $f(x) = 3x + 1$

d) $f(x) = \frac{1}{2}x - 1$

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

$$\begin{aligned} y &= 6 - 5x \\ x &= 6 - 5y \end{aligned}$$

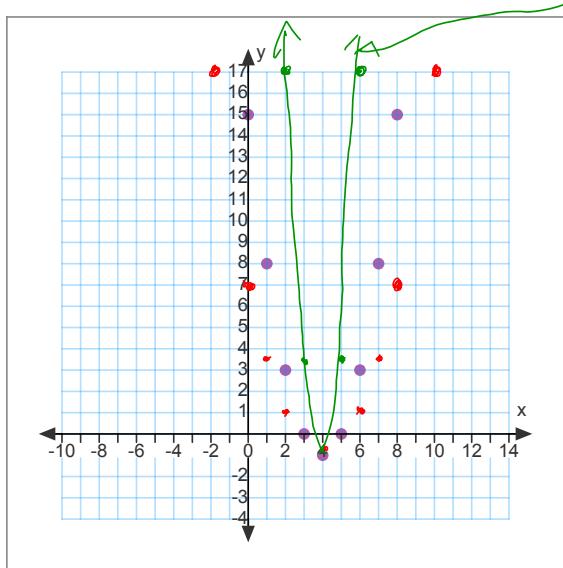
$$\begin{aligned} 5y &= -x + 6 \\ y &= \frac{-x}{5} + \frac{6}{5} \\ &= -\frac{1}{5}x + \frac{6}{5} \end{aligned}$$

$$f^{-1}(x) = -\frac{1}{5}x + \frac{6}{5}$$

p. 70 7. If $f(x) = x^2$, sketch the graph of each function and state the domain and range.

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

c) $y = 0.5f(3(x - 4)) - 1$



$$= \frac{1}{2}(3(x-4))^2 - 1$$

$$\sqrt{(4, -1)}$$

$$D: \{x \in \mathbb{R}\}$$

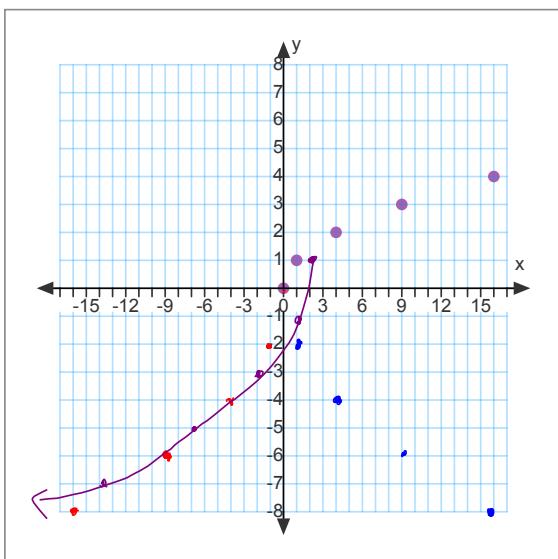
$$R: \{y \in \mathbb{R} \mid y \geq -1\}$$

8. If $f(x) = \sqrt{x}$, sketch the graph of each function and state the domain and range.

a) $y = f(x - 1) + 4$

c) $y = -2f(-(x - 2)) + 1$

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



$$D: \{x \in \mathbb{R} \mid x \leq 2\}$$

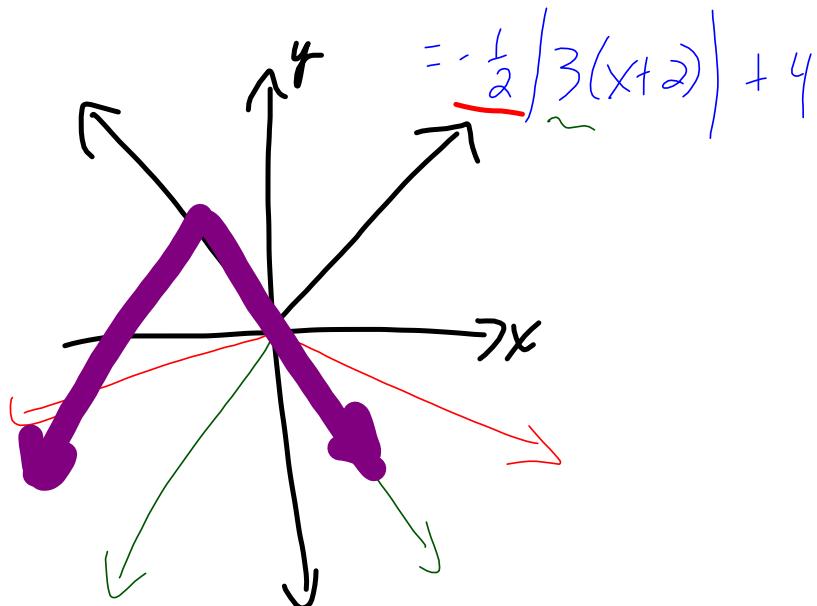
$$R: \{y \in \mathbb{R} \mid y \leq 1\}$$

p. 70

9. If $f(x) = |x|$, sketch the graph of each function and state the domain and range.

a) $y = 2f(x - 3)$

c) $y = -\frac{1}{2}f(3(x + 2)) + 4$



Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) represent and interpret quadratic functions in a number of different forms.

3.1 Properties of Quadratic Functions

Date: _____

Ex. 1: A rocket is launched. Its height is given by the following table.

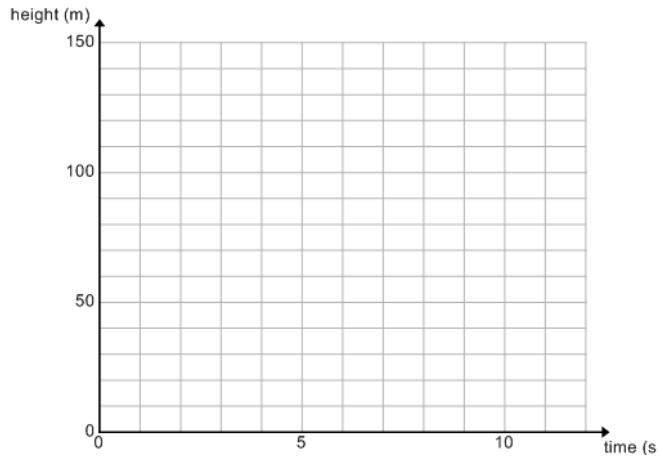
t (sec)	0	1	2	3	4	5	6	7	8	9	10
height (m)	0	44.1	78.4	102.9	117.6	122.5	117.6	102.9	78.4	44.1	0

FD: $44.1 \quad 34.3 \quad 24.5 \quad 14.7 \quad 4.9 \quad -4.9 \quad -14.7 \quad -24.5 \quad -34.3 \quad -44.1$
 SD: $-9.8 \quad -9.8$

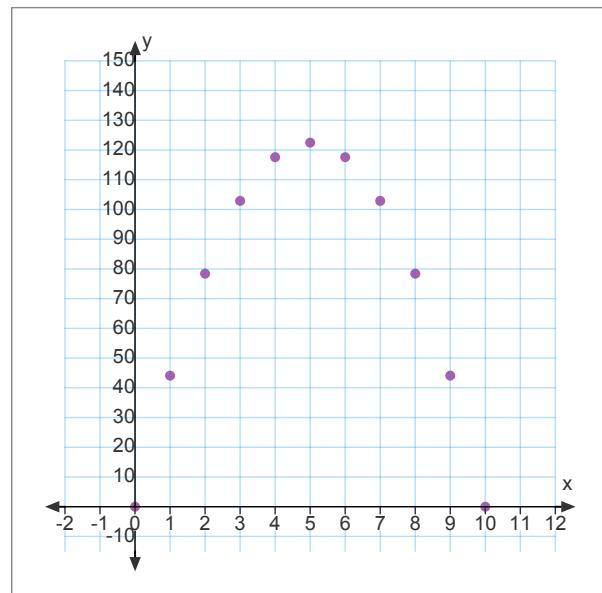
- a) What type of relation is this? How can you tell?



- b) Graph the relation.



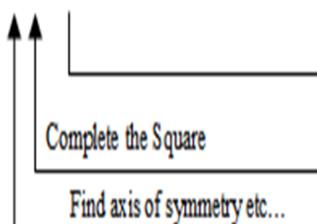
t	h
0	0
1	44.1
2	78.4
3	102.9
4	117.6
5	122.5
6	117.6
7	102.9
8	78.4
9	44.1
10	0



Recall: Three forms of a quadratic relation:

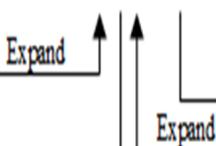
$$y = a(x-h)^2 + k$$

Vertex Form



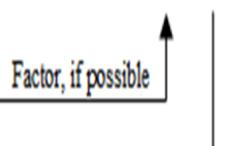
$$y = ax^2 + bx + c$$

Standard Form



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

Factored Form



c) Find the equation of the relation.

Vertex form

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

from data: V(5, 122.5) use $\begin{pmatrix} 0, 0 \\ x, y \end{pmatrix}$

$$\therefore f(x) = a(x-5)^2 + 122.5$$

$$0 = a(0-5)^2 + 122.5$$

$$-122.5 = 25a$$

$$\frac{-122.5}{25} = a$$

$$a = -4.9$$

use $\begin{pmatrix} 0, 0 \\ 10, 0 \end{pmatrix}$ Factorized form

$$f(x) = a(x-r)(x-s)$$

$$= a(x-0)(x-10)$$

$$= a x(x-10)$$

$$44.1 = a(1)(1-10)$$

$$44.1 = a(-9)$$

$$\frac{44.1}{-9} = a$$

$$a = -4.9$$

the equation is $f(x) = -4.9(x-5)^2 + 122.5$ the equation is $h(t) = -4.9t(t-10)$

$$h(t) = -4.9(t-5)^2 + 122.5$$

c) Find the equation of the relation.

Vertex form

$$y = a(x-h)^2 + k \quad V(5, 122.5)$$

$$\therefore y = a(x-5)^2 + 122.5$$

$$0 = a(0-5)^2 + 122.5 \quad \text{use } (0, 0)$$

$$0 = 25a + 122.5$$

$$\frac{-122.5}{25} = a$$

$$-4.9 = a$$

the equation is

$$y = -4.9(x-5)^2 + 122.5$$

$$h = -4.9(t-5)^2 + 122.5$$

$$h(t) = -4.9(t-5)^2 + 122.5$$

$(0, 0) + (10, 0)$

Factored form

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

$$= a(x-0)(x-10)$$

$$= ax(x-10)$$

$$44.1 = a(1)(1-10) \quad \text{use } (1, 44.1)$$

$$44.1 = -9a$$

$$\frac{44.1}{-9} = a$$

$$a = -4.9$$

the equation is $y = -4.9x(x-10)$

$$h(t) = -4.9t(t-10)$$

Ex. 2: For the relation, create a difference table and use it to find the equation.

Check this solution using next slide

x	0	1	2	3	4	5	6
y	15	0	-9	-12	-9	0	15

$$\begin{aligned} & k - 9 - (-5) = -15 \quad -9 \quad -3 \quad 3 \quad 9 \\ & -9 + 15 = 6 \quad 6 \quad 6 \quad 6 \quad 6 \\ & = 6 \quad 2a = 6 \end{aligned}$$

$$y = ax^2 + bx + c \quad \text{y-intercept } (0, 15) \quad \therefore c = 15$$

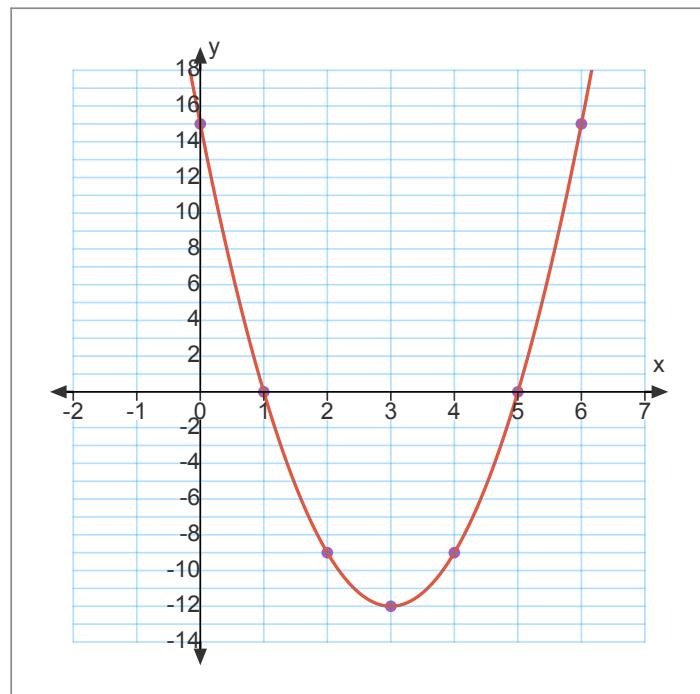
$$\begin{aligned} & \because 2a = 6 \\ & \therefore a = 3 \\ & \therefore y = 3x^2 + bx + 15 \\ & 0 = 3(1)^2 + b(1) + 15 \\ & 0 = 3 + b + 15 \\ & -18 = b \end{aligned}$$

$\therefore y = 3x^2 - 18x + 15$ is the equation.

Ex. 2: For the relation, create a difference table and use it to find the equation.

x	0	1	2	3	4	5	6
y	15	0	-9	-12	-9	0	15

t	h
0	15
1	0
2	-9
3	-12
4	-9
5	0
6	15



$$y = 3x^2 - 18x + 15$$

$$y = 3(x - 3)^2 - 12$$

BE PREPARED FOR UNIT 2 SUMMATIVE TOMORROW!!

Today's Homework Practice includes:

READ pp. 140-145

p. 138 #1 – 7

p. 139 A – F

pp. 145-146 #1 – 8, 9ac, 10

Use Google Classroom Link to watch video proof