

WS PC #1 Review

Key

1) Find each part of the function:

a) vertex: $(-2, -9)$

b) aos: $x = -2$

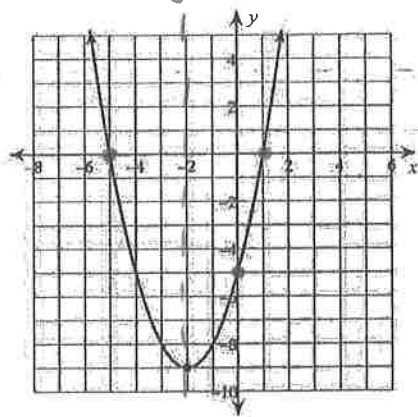
c) y-intercept: $(0, -5)$

d) maximum or minimum value: $y = -9$

e) roots: $(-5, 0)$ $(1, 0)$

f) domain: $x \in \mathbb{R}$

g) range: $y \geq -9$



2) Find each part of the function:

a) vertex: $(2, 16)$

b) aos: $x = 2$

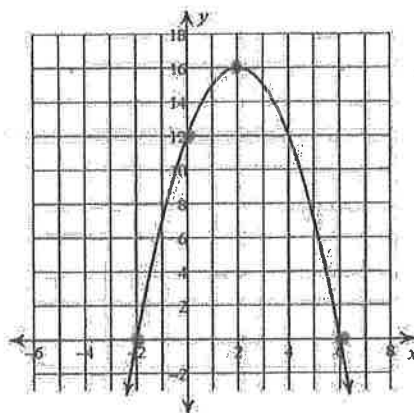
c) y-intercept: $(0, 12)$

d) maximum or minimum value: $y = 16$

e) roots: $(-2, 0)$ $(6, 0)$

f) domain: $x \in \mathbb{R}$

g) range: $y \leq 16$

3) Find the vertex, roots and y-intercept.
Then determine the domain and range.

$$y = x^2 + 8x + 15$$

vertex: $(-4, -1)$

roots: $(-5, 0)$ $(-3, 0)$

y-intercept: $(0, 15)$

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

range: $y \geq -1$

4) Find the vertex, roots and y-intercept.
Then determine the domain and range.

$$y = x^2 - 14x + 48$$

vertex: $(7, -1)$

roots: $(6, 0)$ $(8, 0)$

y-intercept: $(0, 48)$

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

range: $y \geq -1$

- 5) Find the vertex, roots and y-intercept.
Then determine the domain and range.

$$y = -(x + 5)(x - 5)$$

vertex: $(0, 25)$

roots: $(-5, 0)$ $(5, 0)$

y-intercept: $(0, 25)$

domain: all real #'s

range: $y \leq 25$

- 6) Find the vertex, roots and y-intercept.
Then determine the domain and range.

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

vertex: $(2.5, -5)$

roots: $(2, 0)$ $(3, 0)$

y-intercept: $(0, 12)$

domain: all real #'s

range: $y \geq -5$

- 7) Find the vertex and y-intercept. Then find
the maximum or minimum value.

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

vertex: $(-2, -5)$

y-intercept: $(0, -1)$

max/min value: $y = -5$

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

range: $y \geq -5$

- 8) Find the vertex and y-intercept. Then find
the maximum or minimum value.

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

vertex: $(3, 2)$

y-intercept: $(0, -34)$

max/min value: $y = 2$

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

range: $y \leq 2$

9) The function $y = -16t^2 + 25$ represents the height y (in feet) of a pinecone t seconds after falling from a tree.

a) After how many seconds does the pinecone hit the ground?

height = 0

$$0 = -16t^2 + 25$$

$$+16t^2 + 16t^2$$

$$16t^2 = 25$$

$$t = 1.25 \text{ sec}$$

b) How high is the pinecone after 0.5 seconds?

$t = 0.5$

$$y = -16(0.5)^2 + 25$$

$$= -16(0.25) + 25$$

$$= 21 \text{ feet}$$

11) The function $h(t) = -16t^2 + 32t + 2$ models the height (in feet) of a softball t seconds after it is pitched in an underhand motion.

a) Describe the domain and range.

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

Range: $y \leq 18$

b) What is the maximum height of the softball?

$$x = t = \frac{-b}{2a} = \frac{-32}{2(-16)} = 1$$

$$h(t) = -16(1)^2 + 32(1) + 2$$

$$= -16 + 32 + 2$$

$$= 18 \text{ feet}$$

c) How long does it take the softball to reach its maximum height?

1 second

d) How high is the softball after 1 second?

$$h(1) = -16(1)^2 + 32(1) + 2$$

$$= -16 + 32 + 2$$

$$= 18 \text{ feet}$$

10) The function $h(t) = -16t^2 + 16t$ represents the height (in feet) of a horse t seconds after it jumps during a steeplechase.

$$x = t = \frac{-b}{2a}$$

a) How long does it take to reach its maximum height?

$$t = \frac{-16}{2(-16)} = \frac{-16}{-32} = 0.5 \text{ seconds}$$

b) Can the horse clear a fence that is 3.5 feet tall? If so, by how much?

$$h(t) = -16(0.5)^2 + 16(0.5)$$

$$h(t) = 4$$

Yes, by 0.5 feet

12) The function $f(t) = -16t^2 + 88t + 12$ represents the height (in feet) of a pumpkin t seconds after it is launched from a catapult.

a) When does the pumpkin reach its maximum height?

$$x = t = \frac{-b}{2a} = \frac{-88}{2(-16)} = \frac{-88}{-32} = 2.75 \text{ seconds}$$

b) What is the initial height of the pumpkin?

12 feet

c) How high does the pumpkin go before returning to the ground?

maximum height

$$f(2.75) = -16(2.75)^2 + 88(2.75) + 12$$

$$= -16(7.56) + 88(2.75) + 12$$

$$= -120.96 + 242 + 12$$

$$= 133.04 \text{ feet}$$

Determine if each function is linear, quadratic or neither. Explain.

13.

x	1	2	3	4	5	6
y	2	17	13	9	5	1

$+1$ $+1$ $+1$ $+1$ $+1$
 $+15$ -4 -4 -4 -4
 -19 $+0$ $+0$ $+0$

neither

14.

x	y
-3	6
-2	0
-1	-4
0	-6
1	-6
2	-4
3	0
4	6

$+1$ -6 $+2$
 $+1$ -4 $+2$
 $+1$ -2 $+2$
 $+1$ $+0$ $+2$
 $+1$ $+2$ $+2$
 $+1$ $+4$ $+2$
 $+1$ $+6$

quadratic
difference at 2nd level

15.

x	-2	-1	0	1	2
y	1	0	1	4	9

$+1$ $+1$ $+1$ $+1$
 -1 $+1$ $+3$ $+5$
 $+2$ $+2$ $+2$

quadratic
difference at 2nd level

16.

x	y
0	1
1	4
2	7
4	13
5	16

$+1$ $+3$
 $+1$ $+3$
 $+2$ $+6$
 $+1$ $+3$

linear

$$\frac{3}{1} = \frac{3}{1} = \frac{6}{2} = \frac{3}{1}$$

$$\frac{3}{1} = \frac{3}{1} = \frac{3}{1} = \frac{3}{1} \checkmark$$