

Answer the following problems below.

1) A projectile is launched with an upward velocity of 50 ft/sec and it has an initial height of 35 feet.

a) Write a function that models its height using this format:  $h(t) = -16t^2 + v_0t + h_0$ .

$v_0 = 50 \text{ ft/sec}$   
 $h_0 = 35 \text{ ft}$   $\therefore h(t) = -16t^2 + 50t + 35$

b) Locate the y-intercept of this function and write it as an ordered pair.

$y\text{-intercept} = 35 \therefore (0, 35)$

2)

x	0	1	-1	2	-2	3
y	-3	-4	0	-3	5	0

a) Determine the minimum y-value for this quadratic function.

The minimum y-value of -4 occurs @  $x=1$ .

b) Locate the y-intercept of this quadratic function.

The y-intercept of -3 occurs @  $x=0$ .  
 $\therefore y\text{-intercept as ordered pair is } (0, -3)$ .

3) a) Locate the y-intercepts of these functions.

$h_1(t) = -16t^2 + 90t + 40$   
 $h_2(t) = -16t^2 + 120t + 30$

At  $t=0$ ,  $h_1(t) = 40 \therefore y\text{-intercept is } (0, 40)$   
At  $t=0$ ,  $h_2(t) = 30 \therefore y\text{-intercept is } (0, 30)$

b) Which function has the greater y-intercept?

Function  $h_1(t)$  has the greater y-intercept.

4) a) Determine the equation of the line that contains these points.

x	y
9	2
3	-2
-3	-6
-9	-10

Slope =  $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 2}{3 - 9} = \frac{-4}{-6} = \frac{2}{3}$

$y = mx + b \Rightarrow 2 = \frac{2}{3} \cdot 9 + b \Rightarrow 2 = 6 + b \Rightarrow -4 = b$

b) Locate the y-intercept of this linear function.

$\therefore$  Equation of line  $y = \frac{2}{3}x - 4$

So the y-intercept of the linear function  $y = \frac{2}{3}x - 4$  is -4; as an ordered pair it's  $(0, -4)$ .

5) What is the y-intercept of the:

a) exponential function?  $-1$

b) linear function?  $1$

c) quadratic function?  $0$

Which y-intercept is highest?

The y-intercept of the linear function is the highest.

6) Locate the y-intercepts of these functions using substitution [let  $x = 0$ ].

a)  $y = 6^x - 2$   
 $y = 6^0 - 2 = 1 - 2 = -1 \therefore y\text{-intercept is } -1$ .

b)  $y = -3x + 4$   
 $y = -3(0) + 4 = 4 \therefore y\text{-intercept is } 4$ .

c)  $y = 13x^2 + 1700x + 500$   
 $y = 13(0)^2 + 1700(0) + 500 = 500 \therefore y\text{-intercept is } 500$ .

7) Locate the y-intercepts of these functions using substitution [let  $x = 0$ ].

a)  $y = -4x^3 + 5x^2 + 17x + 6$   
 $y = -4(0)^3 + 5(0)^2 + 17(0) + 6 = 6 \therefore y\text{-intercept is } 6$ .

b)  $y = -7|x| + 4$   
 $y = -7|0| + 4 = 4 \therefore y\text{-intercept is } 4$ .

c)  $y = \frac{x-4}{x+5}$   
 $y = \frac{0-4}{0+5} = \frac{-4}{5} \therefore y\text{-intercept is } \frac{-4}{5}$ .

8) a) Write the equation of the line that has the below table of values.

x	-12	-2	0	4	8
y	9	4	?	1	-1

$y = \frac{-1 - 1}{8 - 4} = \frac{-2}{4} = -\frac{1}{2}$

$y = mx + b \Rightarrow 1 = -\frac{1}{2}(4) + b \Rightarrow 1 = -2 + b \Rightarrow 3 = b$

b) Locate the y-intercept of this linear function.

So the y-intercept occurs when  $x=0$ .  
So  $y = -\frac{1}{2}x + 3 = -\frac{1}{2}(0) + 3 = 3 \therefore ? = 3$

$\therefore$  The y-intercept is at 3.