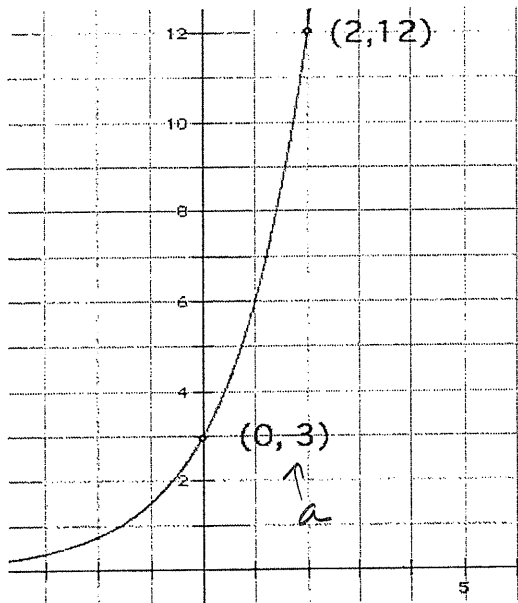


1) Write the **exponential** equation for the graph.



x	y
0	3
2	12

$$3 = a(2)^0$$

$$3 = 1a$$

$$\boxed{a=3}$$

$$b^{2-0} = \frac{12}{3}$$

$$\sqrt{b^2} = \sqrt{4}$$

$$b = 2$$

$$\boxed{y = 3(2)^x}$$

2) Fit a **quadratic** model to the data. Use calculator.

Time (sec)	0	1	2	3	4
Height (ft)	323	332	313	266	191

$$y = -14x^2 + 23x + 323$$

For #3-5) State whether the function described by the equation models exponential growth, exponential decay or neither.

3) $a(b) = 5b^2$

4) $g(x) = (0.75)^x$ (with $\downarrow b$ above the fraction)

5) $h(v) = (3)\left(\frac{7}{4}\right)^v$ (with $\downarrow b$ above the fraction)

• Neither

• Decay

• Growth

• Exponent not the variable

• $0 < b < 1$

• $b > 1$

6) An Isotope of tantalum ^{179}Ta has half-life of 1.82 hours. How much of an 8-gram sample will be left after 6 hours? Round answer to 3 decimal places.

$$0.5 = 1(b)^{1.82}$$

$$(0.5)^{1/1.82} = (b)^{1.82/1.82}$$

$$\boxed{b = 0.683}$$

$$y = 8(0.683)^6$$

$$\boxed{y = 0.812 \text{ grams}}$$

6) Suppose a ball is thrown upward at a velocity of 17m/sec from a 30-meter building.

a) Write an equation for the height h above the ground of the ball after t seconds.

Use the formula: $h = -\frac{1}{2}gt^2 + v_0t + h_0$ where $g = 9.8m/sec^2$

$$h = -\frac{1}{2}(9.8)t^2 + 17t + 30$$

$$h = -4.9t^2 + 17t + 30$$

b) Predict the height of the ball after 2 seconds.

$$h = -4.9(2)^2 + 17(2) + 30$$

$$h = 44.4 \text{ m}$$

c) At what time will the ball hit the ground? (Hint - Use the Quadratic Formula)

$$0 = -4.9t^2 + 17t + 30$$

$$a = -4.9 \quad b = 17 \quad c = 30$$

$$X = \frac{-17 \pm \sqrt{(17)^2 - 4(-4.9)(30)}}{2(-4.9)}$$

$$X = \frac{-17 \pm \sqrt{877}}{-9.8}$$

$$X = \frac{-17 + \sqrt{877}}{-9.8} = -1.29 \text{ sec}$$

not valid

$$X = \frac{-17 - \sqrt{877}}{-9.8} = 4.76 \text{ sec}$$

7) A parabola contains the points $(-3, 26)$, $(-2, 9)$, and $(-1, -2)$

a) Set up the system of equations.

$$26 = a(-3)^2 + b(-3) + c \rightarrow 26 = 9a - 3b + c$$

$$9 = a(-2)^2 + b(-2) + c \rightarrow 9 = 4a - 2b + c$$

$$-2 = a(-1)^2 + b(-1) + c \rightarrow -2 = 1a - 1b + c$$

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

b) Write the matrix equation.

$$\begin{bmatrix} 9 & -3 & 1 \\ 4 & -2 & 1 \\ 1 & -1 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 26 \\ 9 \\ -2 \end{bmatrix}$$

[A] [X] [B]

$$[X] = [A]^{-1}[B]$$

$$[X] = \begin{bmatrix} 3.7 \\ -2.7 \\ -7 \end{bmatrix} \begin{matrix} \rightarrow a \\ \rightarrow b \\ \rightarrow c \end{matrix}$$

c) Write the equation for the parabola. (Hint - Quadratic Equation)

$$y = 3x^2 - 2x - 7$$