

Section 7-2 Identifying functions from Graph Patterns

*Review notes from Section 1-2 (4 main graphs to know: linear, quadratic, exponential, power)

*Understand Concave Up or Concave Down

*For Linear Equations, remember Point-slope Form also

$$y - y_1 = m(x - x_1) \quad \text{where } m \text{ is slope and } (x_1, y_1) \text{ is any point on the line}$$

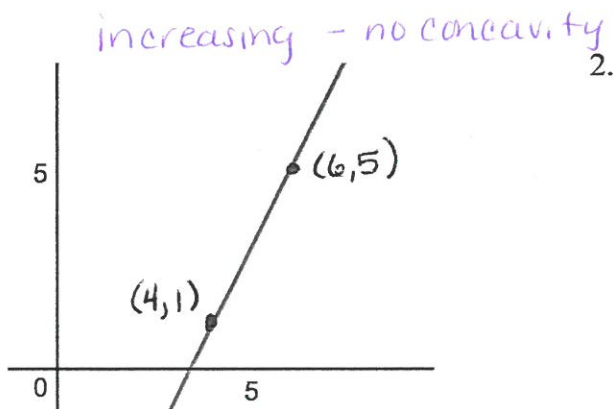
*For Quadratic Equations, remember Vertex Form also

$$y - k = a(x - h)^2 \quad \text{where } (h, k) \text{ is vertex and } a \text{ is vertical dilation (narrow or wide)}$$

For each example below:

- A. Identify the type of function it could be.
- B. On what interval or intervals is the function increasing or decreasing, and which way is the graph concave?
- C. From your experience, what relationship in the real world could be modeled by a function with this shape of graph?
- D. Find the particular equation for the function if the given points are on the graph.
- E. Confirm that your equation gives the graph shown (check on graphing calculator).

1.



$$y = mx + b \quad m = \frac{5-1}{6-4} = \frac{4}{2} = 2$$

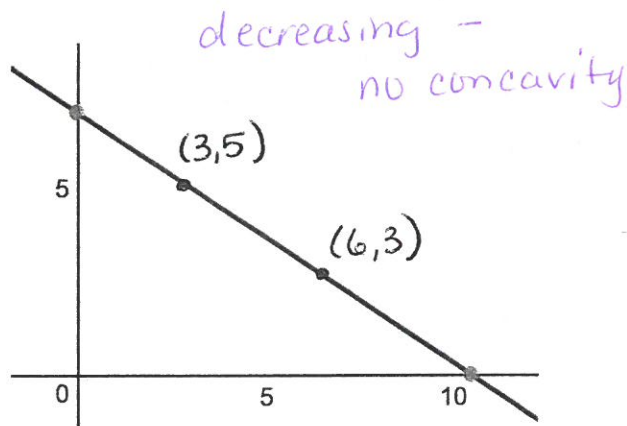
$$y = 2x + b$$

$$1 = 2(4) + b$$

$$-7 = b$$

$$y = 2x - 7$$

2.



$$m = \frac{5-3}{3-6} = \frac{2}{-3}$$

$$5 = \frac{2}{-3}(3) + b$$

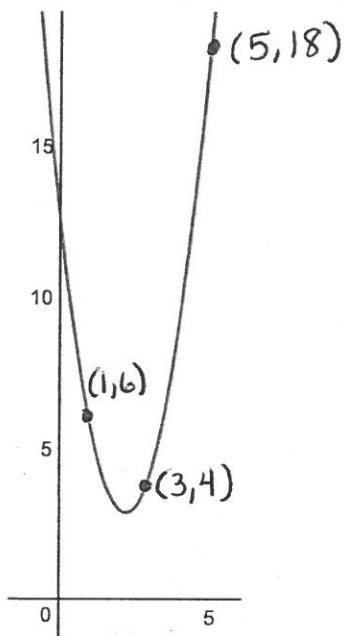
$$5 = -2 + b$$

$$7 = b$$

$$y = -\frac{2}{3}x + 7$$

decreasing to vertex, then increasing
concave up

3.



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

$$18 = a(5)^2 + b(5) + c$$

$$4 = a(3)^2 + b(3) + c$$

$$6 = a(1)^2 + b(1) + c$$

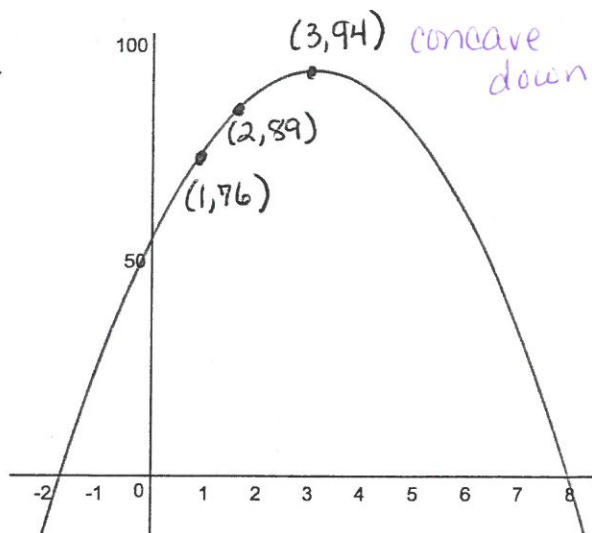
$$\begin{bmatrix} 25 & 5 & 1 & 18 \\ 9 & 3 & 1 & 4 \\ 1 & 1 & 1 & 6 \end{bmatrix}$$

$$a = 2 \quad b = -9 \quad c = 13$$

$$y = 2x^2 - 9x + 13$$

increasing, then decreasing

4.



$$94 = a(3)^2 + b(3) + c$$

$$89 = a(2)^2 + b(2) + c$$

$$76 = a(1)^2 + b(1) + c$$

$$\begin{bmatrix} 9 & 3 & 1 & 94 \\ 4 & 2 & 1 & 89 \\ 1 & 1 & 1 & 76 \end{bmatrix}$$

$$a = -4 \quad b = 25 \quad c = 55$$

$$y = -4x^2 + 25x + 55$$