**Unit 3 Day 2 – Key Features of Quadratic Functions**

Y-values decreasing $x < -2$

TURNING POINT Vertex

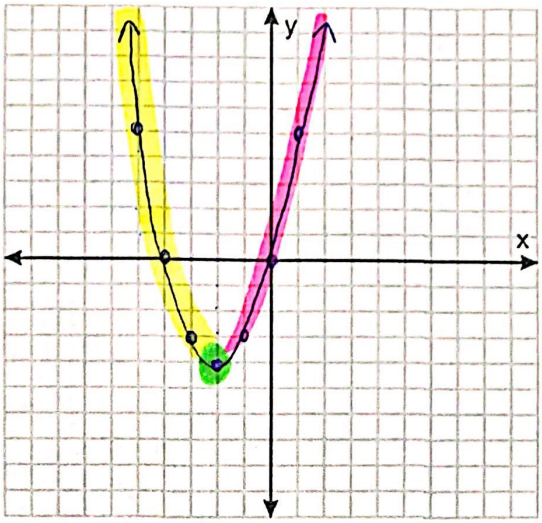
Y-values Increasing $x > -2$

| $x$ | $y$ | 1st | 2nd |
|---|---|---|---|
| -5 | 5 | //// | //// |
| -4 | 0 | -5 | //// |
| -3 | -3 | -3 | 2 |
| -2 | -4 | -1 | 2 |
| -1 | -3 | 1 | 2 |
| 0 | 0 | 3 | 2 |
| 1 | 5 | 5 | 2 |

x-intercept

x & y-intercept

not constant — constant




A. Graph the function.

B. Is the function linear, quadratic, exponential or neither? Justify your answer mathematically.
Quadratic ⇒ U-shaped curve called a parabola and common 2nd difference.

C. Determine the y-intercept.
(0,0)

D. Determine the vertex. What are characteristics that can help you identify the vertex?
(−2,−4) Turning point ⇒ The 1st difference changed from negative to positive.

E. Is the vertex a maximum or a minimum? MINIMUM (lowest y-value)

F. Determine the decreasing interval. $x < -2$ or $(-\infty, -2)$

G. Determine the increasing interval. $x > -2$ or $(-2, \infty)$

H. Determine the range. $y \geq -4$ or $[-4, \infty)$ * use y-value of vertex

I. Determine the x-intercept(s). (−4,0) and (0,0)

J. Determine the domain. $(-\infty, \infty)$ or $\mathbb{R}$

2.

| $x$ | $y$ |
|---|---|
| 1 | 0 |
| 2 | -3 |
| 3 | -12 |
| 4 | -27 |
| 5 | -48 |

3.

decreasing

vertex

Increasing

| $x$ | $y$ | 1st | 2nd |
|---|---|---|---|
| -5 | 12 | //// | //// |
| -4 | 6 | -6 | //// |
| -3 | 4 | -2 | 4 |
| -2 | 6 | 2 | 4 |
| -1 | 12 | 6 | 4 |

Quadratic because there is a common 2nd Difference

4.

| $x$ | $y$ |
|---|---|
| -3 | -3 |
| -2 | -8 |
| -1 | -15 |
| 0 | -24 |
| 1 | -35 |
| 2 | -48 |
| 3 | -63 |