

Mixed problems Review with standard, intercept, and vertex forms: February 6, 2015 (Fri)

Standard form: $y = ax^2 + bx + c$

Intercept form: $y = a(x - p)(x - q)$

Vertex: $x = \frac{-b}{2a}$ A.O.S: $x = \frac{-b}{2a}$

x-intercepts: $(p, 0)$ and $(q, 0)$ Vertex: $x = \frac{p+q}{2}$ A.O.S: $x = \frac{p+q}{2}$

*To find Avg. R.O.C., find slope between endpoints

Vertex Form: $y = a(x - h)^2 + k$ vertex: (h, k) A.O.S: $x = h$

slope = $\frac{y_2 - y_1}{x_2 - x_1}$

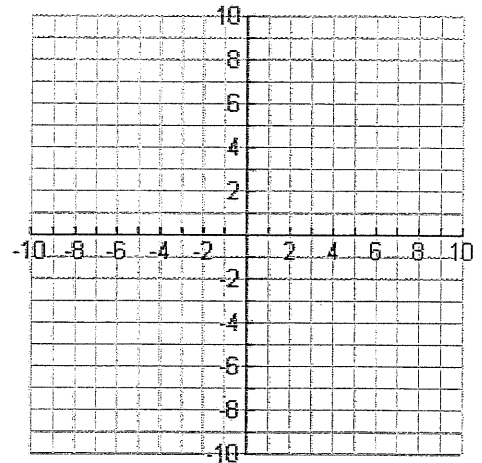
1. Graph $y = -2x^2 + 12x - 16$ Form: _____ Opens: _____

Vertex: _____ a = _____ Max / Min (Circle one)

AOS: _____ x - intercept(s): _____ y - intercept: _____

Domain: _____ Range: _____

Avg. Rate of Change [3, 6]: _____



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow$ _____ Increasing: _____ Positive: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____ Decreasing: _____ Negative: _____

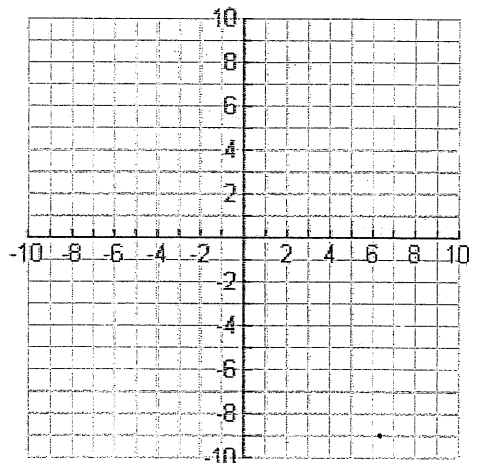
2. Graph $y = -(x + 3)(x - 3)$ Form: _____

Vertex: _____ a = _____ Max / Min (Circle one)

AOS: _____ x - intercept(s): _____ y - intercept: _____

Domain: _____ Range: _____

Avg. Rate of Change [1, 4]: _____



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow$ _____ Increasing: _____ Positive: _____

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Standard form: $y = ax^2 + bx + c$

Vertex: $x = \frac{-b}{2a}$ A.O.S: $x = \frac{-b}{2a}$

*To find Avg. R.O.C., find slope between endpoints

Slope = $\frac{y_2 - y_1}{x_2 - x_1}$

Intercept form: $y = a(x - p)(x - q)$

x-intercepts: $x = p, x = q$ Vertex: $x = \frac{p+q}{2}$ A.O.S: $x = \frac{p+q}{2}$

Vertex Form: $y = a(x - h) + k$ vertex: (h, k) A.O.S: $x = h$

3. Graph $y = (x - 5)^2 - 4$ Form: _____ Opens: _____

Vertex: _____ a = _____ Max / Min (Circle one)

AOS: _____ x - intercept(s): _____ y - intercept: _____

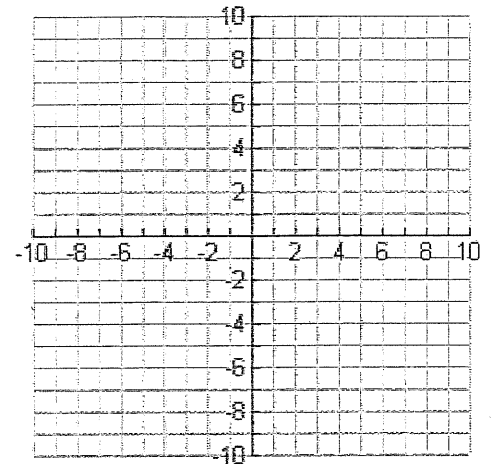
Domain: _____ Range: _____

Avg. Rate of Change [4, 5]: _____

End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow$ _____ Increasing: _____ Positive: _____

As $x \rightarrow -\infty, f(x) \rightarrow$ _____ Decreasing: _____ Negative: _____



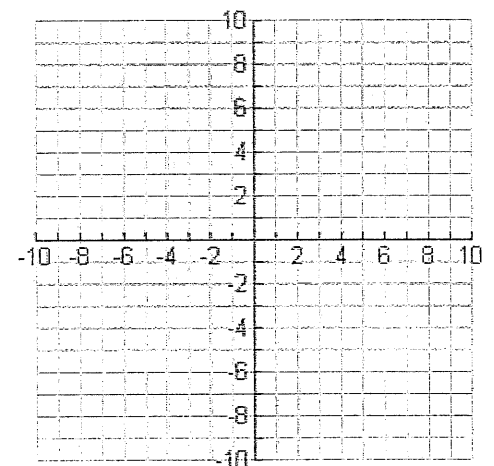
4. Graph $y = -x^2 - 10x - 24$ Form: _____ Opens: _____

Vertex: _____ a = _____ Max / Min (Circle one)

AOS: _____ x - intercept(s): _____ y - intercept: _____

Domain: _____ Range: _____

Avg. Rate of Change [-8, -5]: _____



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow$ _____ Increasing: _____ Positive: _____

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To find Avg. R.O.C., find slope between endpoints

Vertex Form: $y = a(x - h)^2 + k$ vertex: (h, k) A.O.S: $x = h$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{-12}{2(-2)} = \frac{-12}{-4} = 3$$

Key

1. Graph $y = -2x^2 + 12x - 16$ Form: standard Opens: down

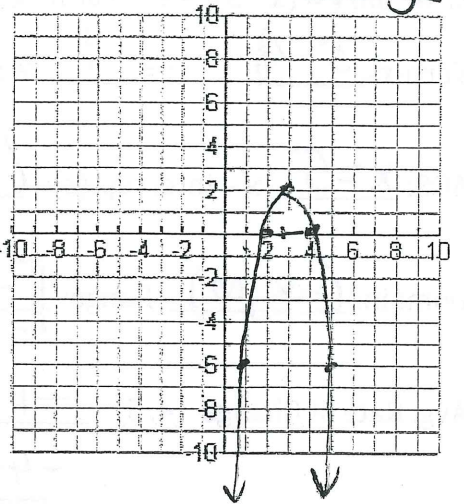
Vertex: (3, 2) $a = -2$ (Max) / Min (Circle one)

AOS: $x = 3$ x-intercept(s): (2, 0)(4, 0) y-intercept: (0, -16)

Domain: $(-\infty, \infty)$ Range: $(-\infty, 2]$

Avg. Rate of Change [3, 6]: -6 $m = \frac{-16 - 2}{6 - 3} = \frac{-18}{3} = -6$

x	y
1	-8
2	0
3	2
4	0
5	-6



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow -\infty$ Increasing: $(-\infty, 3)$ Positive: $(2, 4)$

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ Decreasing: $(3, \infty)$ Negative: $(-\infty, 2) \cup (4, \infty)$

2. Graph $y = -(x + 3)(x - 3)$ Form: intercept opens down

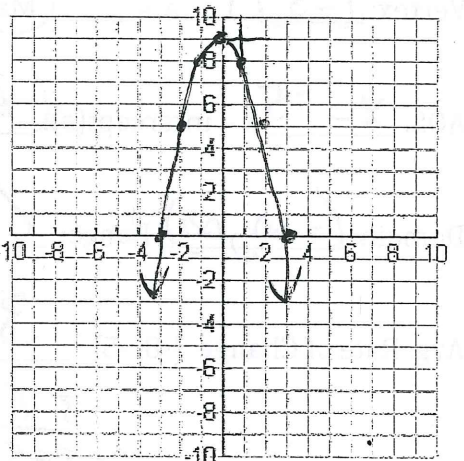
Vertex: (0, 9) $a = -1$ (Max) / Min (Circle one)

AOS: $x = 0$ x-intercept(s): (-3, 0)(3, 0) y-intercept: (0, 9)

Domain: $(-\infty, \infty)$ Range: $(-\infty, 9]$

Avg. Rate of Change [1, 4]: -5 $\frac{8+7}{1-4} = \frac{15}{-3} = -5$

x	y
-2	5
-1	8
0	9
1	8
2	5



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow -\infty$ Increasing: $(-\infty, 0)$ Positive: $(-3, 3)$

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ Decreasing: $(0, \infty)$ Negative: $(-\infty, -3) \cup (3, \infty)$

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Vertex Form: $y = a(x - h) + k$ vertex: (h, k) A.O.S: $x = h$

Slope = $\frac{y_2 - y_1}{x_2 - x_1}$

3. Graph $y = (x - 5)^2 - 4$ Form: Vertex Opens: up

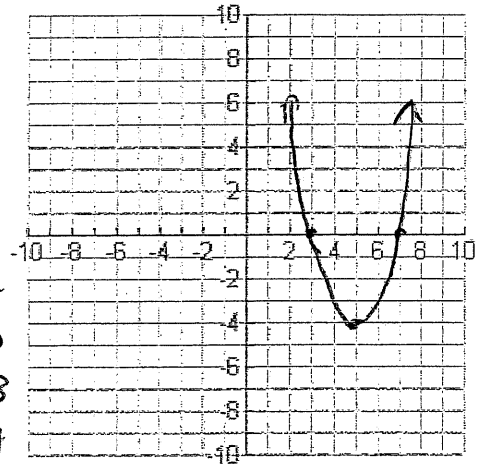
Vertex: (5, -4) $a =$ 1 Max / Min (Circle one)

AOS: $x = 5$ x-intercept(s): (3, 0)(7, 0) y-intercept: (0, 21)

Domain: $(-\infty, \infty)$ Range: $[-4, \infty)$

Avg. Rate of Change [4, 5]: -1 (4, -3)
(5, -4)
 $\frac{-4 - (-3)}{5 - 4} = \frac{-1}{1}$

x	y
3	0
4	-3
5	-4
6	-3
7	0



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow \infty$ Increasing: $(5, \infty)$ Positive: $(-\infty, 3) \cup (7, \infty)$

As $x \rightarrow -\infty, f(x) \rightarrow \infty$ Decreasing: $(-\infty, 5)$ Negative: $(3, 7)$

$$\frac{10}{2(-1)} = -5$$

4. Graph $y = -x^2 - 10x - 24$ Form: Standard Opens: down

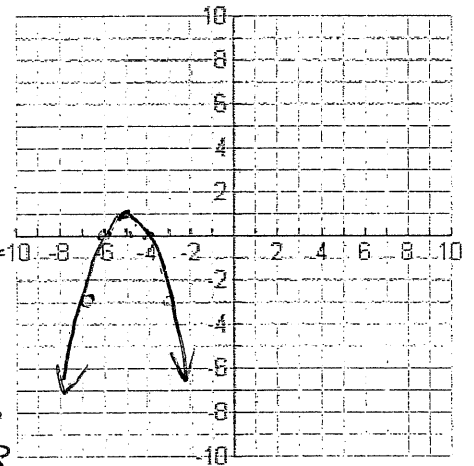
Vertex: (-5, 1) $a =$ -1 Max / Min (Circle one)

AOS: $x = -5$ x-intercept(s): (-6, 0)(-4, 0) y-intercept: (0, -24)

Domain: $(-\infty, \infty)$ Range: $(-\infty, 1]$

Avg. Rate of Change [-8, -5]: 3 (-8, -8)
(-5, 1)
 $\frac{1 - (-8)}{-5 - (-8)} = \frac{9}{-3} = -3$

x	y
-6	0
-5	1
-4	0
-3	-3



End Behavior:

As $x \rightarrow \infty, f(x) \rightarrow -\infty$ Increasing: $(-\infty, -5)$ Positive: $(-6, -4)$

As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ Decreasing: $(-5, \infty)$ Negative: $(-\infty, -6) \cup (-4, \infty)$