**Before we begin, are there any questions from last day's work?**

# Today's Learning Goal(s):

By the end of the class, I will be able to:

a) consolidate understanding of domain and range.

b) learn terminology of leading coefficient and end behaviour.

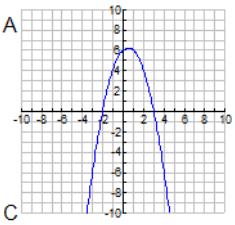
Don't forget PPT 2.1.1

**2.1.1: Match It!** Date: Sept. 23/19

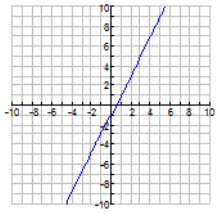
Match each given function with the graph on the right-hand side.

1. C $y = 2x+1$ ← $m = 2 \therefore \frac{2}{1}$ rise / run
2. H $y = x^2 - x - 6$ $0 = (x-3)(x+2)$ $x = 3$ $x = -2$
3. A $y = -x^2 + x + 6$ $= -(x^2 - x - 6)$ $= -(x-3)(x+2)$ $x = 3, x = -2$
4. B $y = 2x-1$
5. F $y = x^2 + x - 6$ $= (x+3)(x-2)$ $\therefore x = -3, 2$
6. G $y = -2x-1$
7. D $y = -x^2 - 5x - 6$ $= -(x^2 + 5x + 6)$ $= -(x+3)(x+2)$ $\therefore x = -3, -2$
8. E $y = -2x+1$

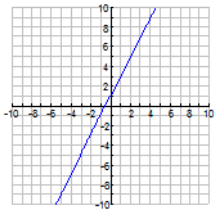
A



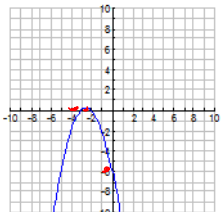
B



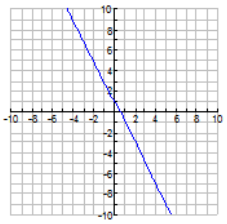
C



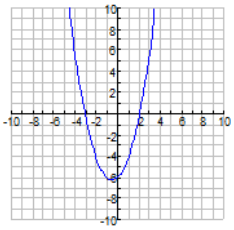
D



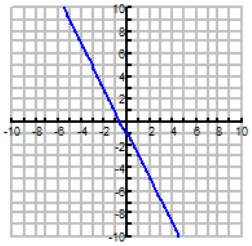
E



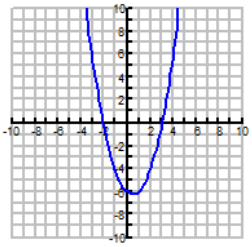
F



G



H



## 2.1.2: Linear and Quadratic Functions

Date: _____

| Function | Domain and Range | Degree | Leading Coefficient | End Behaviour |
|---|---|---|---|---|
| 1. $y = 2x+1$ | {$x$ Є R}<br>{y Є R} | 1 | 2 | As $x \to \infty, y \to \infty$<br>As $x \to -\infty, y \to -\infty$ |
| 2. $y = x^2 - x - 6$ | {$x$ Є R}<br>{y Є R/ $y \geq -6.1$} | 2 | 1 | As $x \to \infty, y \to \infty$<br>As $x \to -\infty, y \to \infty$ |
| 3. $y = -x^2 + x + 6$ | {$x$ Є R}<br>{y Є R/ $y \leq 6.1$} | 2 | -1 | As $x \to \infty, y \to -\infty$<br>As $x \to -\infty, y \to -\infty$ |
| 4. $y = 2x - 1$ | {$x$ Є R}<br>{y Є R} | 1 | 2 | As $x \to \infty, y \to \infty$<br>As $x \to -\infty, y \to -\infty$ |
| 5. $y = x^2 + x - 6$ | {$x$ Є R}<br>{y Є R/ $y \geq -6.2$} | 2 | 1 | As $x \to \infty, y \to \infty$<br>As $x \to -\infty, y \to \infty$ |
| 6. $y = -2x - 1$ | {$x$ Є R}<br>{y Є R} | 1 | -2 | As $x \to \infty, y \to -\infty$<br>As $x \to -\infty, y \to \infty$ |
| 7. $y = -x^2 - 5x - 6$ | {$x$ Є R}<br>{y Є R/ $y \leq 0.25$} | 2 | -1 | As $x \to \infty, y \to -\infty$<br>As $x \to -\infty, y \to -\infty$ |
| 8. $y = -2x + 1$ | {$x$ Є R}<br>{y Є R} | 1 | -2 | As $x \to \infty, y \to -\infty$<br>As $x \to -\infty, y \to \infty$ |

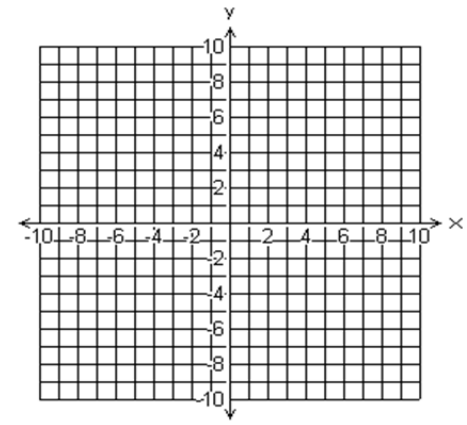
## 2.1.3: Linear and Quadratic Functions – Practice

Date: _____

For each of the given functions, sketch the graph of the relation, creating a table of values if necessary. Use the graph and the equation to fill in the table relating to each graph.

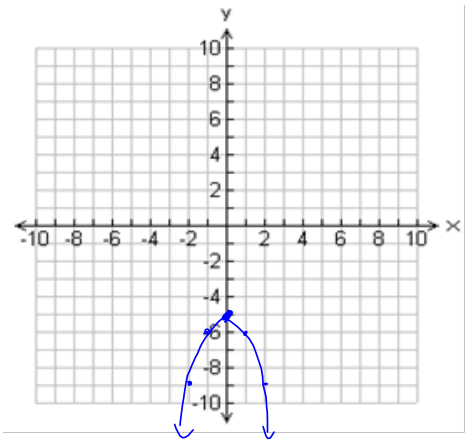
1. $y = -3x + 2$

| | |
|---|---|
| Domain | |
| Range | |
| Degree | |
| Sign of Leading Coefficient | |
| End Behaviour | |
| Is the relation a function? | |




2. $y = -x^2 - 5$ V(0, -5)

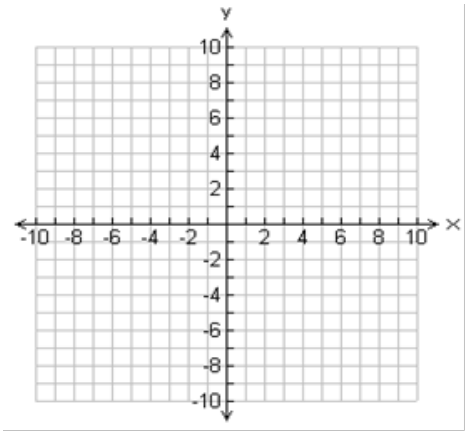
| | |
|---|---|
| Domain | $\{x \in \mathbb{R}\}$ |
| Range | $\{y \in \mathbb{R} \mid y \leq -5\}$ |
| Degree | 2 |
| Sign of Leading Coefficient | − |
| End Behaviour | $x \to \infty, y \to -\infty$<br>$x \to -\infty, y \to -\infty$ |
| Is the relation a function? | yes |




$y = -(x-0)^2 - 5$

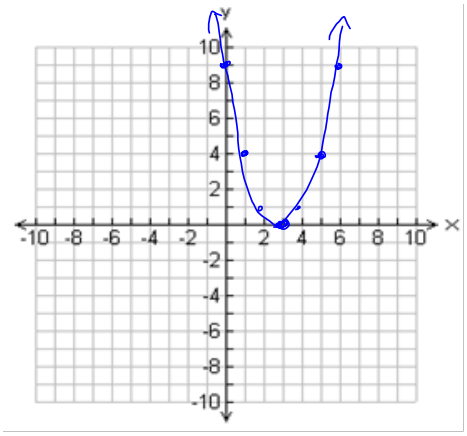
3. $y = \frac{1}{2}x + 4$

| | |
|---|---|
| Domain | |
| Range | |
| Degree | |
| Sign of Leading Coefficient | |
| End Behaviour | |
| Is the relation a function? | |



4. $y = x^2 - 6x + 9$ $= (x-3)^2$

| | |
|---|---|
| Domain | $\{x \in \mathbb{R}\}$ |
| Range | $\{y \in \mathbb{R} \mid y \geq 0\}$ |
| Degree | 2 |
| Sign of Leading Coefficient | + |
| End Behaviour | $x \to \infty,\ y \to \infty$<br>$x \to -\infty,\ y \to \infty$ |
| Is the relation a function? | Yes, passes the V.L.T. |

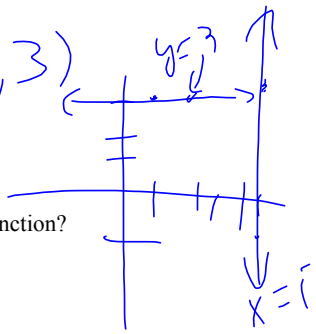


5. Is it possible to graph a line of the form $y = mx + b$ that will not result in a function? Explain your reasoning.

No; only vertical lines are not functions, and they have equations in the form $x = a$.

$y = 3$

$(1, 3)(2, 3)$




6. Is it possible to graph a quadratic relation of the form $y = ax^2 + bx + c$ that will not result in a function? Explain your reasoning.

No. All parabolas that are NOT functions are in the form $x = y^2$.

$x = 5$ $(5, -1)(5, 4)$