

Relations and Functions

Key Ideas:

1. Representing Relations

- Arrow diagrams, tables of values, ordered pairs, words

2. Domain (x) and Range (y)

- Look for boundary points
- $x \in \mathbb{R}, y \in \mathbb{R}$ (graph hits every x and y value)
- $x \leq 4, y > -4$ (look for a definite start and end)
- $-3 \leq x \leq 6$, or $-5 < y < 0$ (closed interval)

3. Functions

- For every x , there is only one y
- Vertical line test

4. Representing Linear Relations

- Graph (a line)
- Equation (degree of 1, ie: $y = 2x - 5$)
- Table of values/set of ordered pairs (constant change in x and constant change in y)

5. Interpreting Graphs

6. Functional Notation

- Re-write "y" as " $f(x)$ "
- Solve $f(-3)$, work forwards
- Solve $f(x) = 5$, work backwards
- Functions can be given as:
 - i. graph
 - ii. table of values
 - iii. set of ordered pairs
 - iv. mapping diagram
 - v. Equation

***Note: Watch your positive and negative signs!!**

Representing Relations/Domain/Range/Functions

1. a) Represent the following as an **arrow diagram**:
 $\{(1, 8), (2, 7), (2, 6), (3, 5)\}$

b) Is this a **function**, how do you know?

c) State the **domain**:

d) State the **range**:

2. This table represents a relation.

a) Describe the relation in words.

Name	Sport
Perdita Felicien	Track
Donavan Bailey	Track
Nancy Greene	Skiing
Annamay Pierse	Swimming
Justin Morneau	Baseball
Steve Nash	Basketball

b) Represent this relation as a set of ordered pairs.

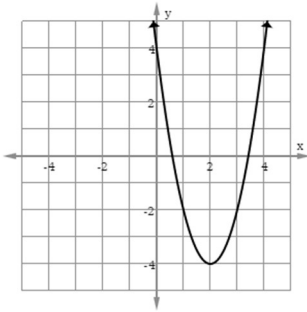
c) Determine the independent and dependent variables.

3. State the **domain** and **range** of the following relations. Indicate whether the relation is also a function.

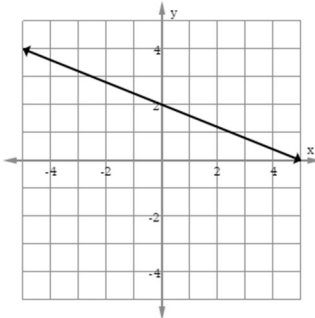
a) $y = -4x + 7$

b) $\{(-3, 5), (0, 4), (5, -3), (3, 3)\}$

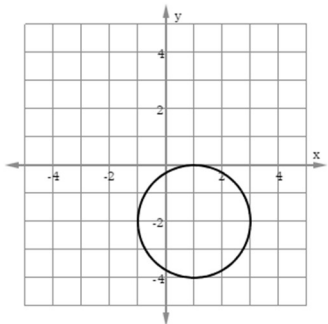
c)



d)



e)



Representing Linear Relations/Interpreting graphs

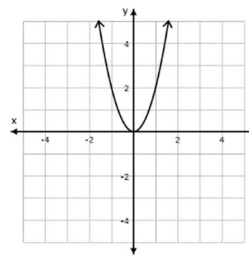
4. Identify the following as **linear** or **non-linear**. Explain how you know this.

a) $4x^2 + 3 = 6y$

b) $5x - 2y = -8$

c) $(2, 5), (6, 10), (10, 15)$

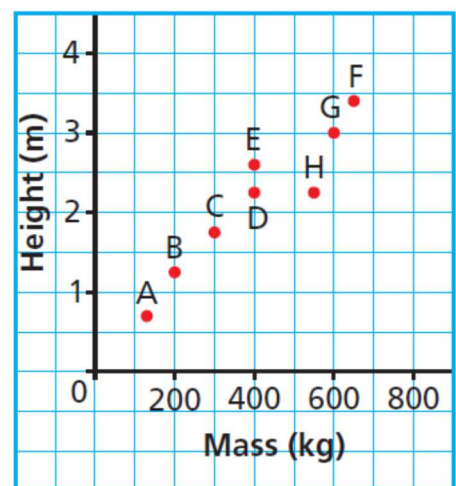
d)



5. Each point on the graph represents a polar bear. Explain the answer to each question below.

a) Which bear has the greatest mass? What is this mass?

Heights and Masses of 8 Polar Bears



b) Which bear is the shortest? What is its height?

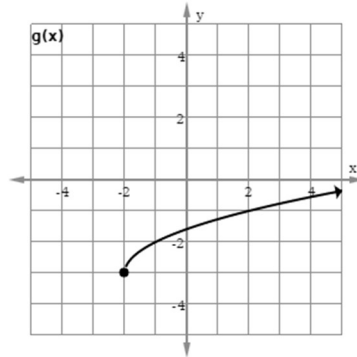
c) Which two bears have the same mass? What is this mass?

d) Which two bears have the same height? What is this height?

Function Notation

6. Given the following functions, find:

$$f(x) = 5x + 13$$



$$h(x) = \{(-5, 8), (-4, 7), (3, -9)\}$$

a) $f(-4) =$

d) $h(3) =$

b) $g(2) =$

e) **find** x when $f(x) = 3$

c) **find** x when $g(x) = -3$

f) **find** x when $h(x) = 5$

7. Patty lifts weights at the local gym. The equation $M = 5n + 2.5$ represents the mass lifted, M kilograms, when the number of 5-kg masses on the bar is n .

a) Write the equation using function notation.

b) Find the value of $M(6)$. What does this value represent?

c) Find the value of n when $M(n) = 42.5$. What does this number represent?