

**U3D1 WORKSHEET Part A Functions, Relations, Domain & Range**

- Sketch a relation with the following properties.
  - It is a function with  $D: \{x|x \in \mathbb{R}\}$ ,  $R: \{y|y \in \mathbb{R}, y \leq 5\}$
  - It is not a function and  $D: \{x|x \in \mathbb{R}, -3 \leq x \leq 3\}$ ,  $R: \{y|y \in \mathbb{R}, -3 \leq y \leq 3\}$
- Is each relation a function? Explain. (Sketch a graph of each, if you like.)
  - $y = x - 5$
  - $x = y^2 - 3$
  - $y = 2(x - 1)^2 - 2$
  - $x^2 + y^2 = 4$
- Is each relation a function? Justify your answer. If the relation is a function, state the independent variable and the dependent variable.
  - The amount of money taken in for the fundraiser is related to the number of raffle tickets a hockey team sells.
  - The age of students is related to their grade level.
  - The time it takes Matteo to walk to school is related to the speed at which he walks.
- For each given domain and range, draw one relation that is a function and one that is not. Use the same set of axes for each part.
  - Domain:  $\{x|x \in \mathbb{R}\}$ , Range:  $\{y|y \in \mathbb{R}\}$
  - Domain:  $\{x|x \in \mathbb{R}\}$ , Range:  $\{y|y \in \mathbb{R}, y \leq -1\}$
  - Domain:  $\{x|x \in \mathbb{R}, x \leq 2\}$ , Range:  $\{y|y \in \mathbb{R}, y \geq -2\}$
- Avery has 90 m of fencing to enclose an area in a petting zoo with two dividers to separate three types of young animals.
 

The three pens are to have the same area.

pigs	lambs	rabbits	x
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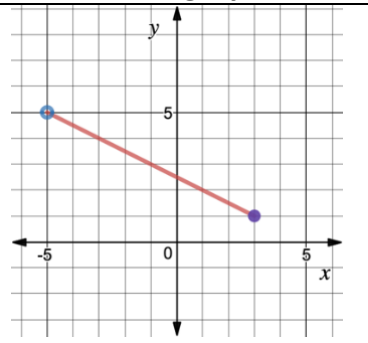
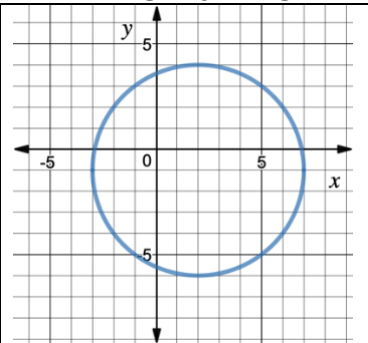
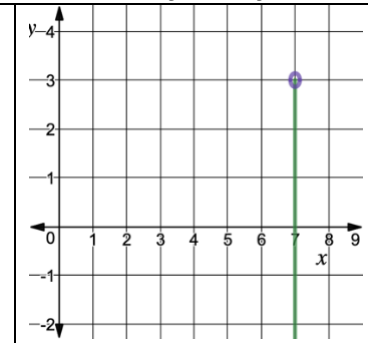
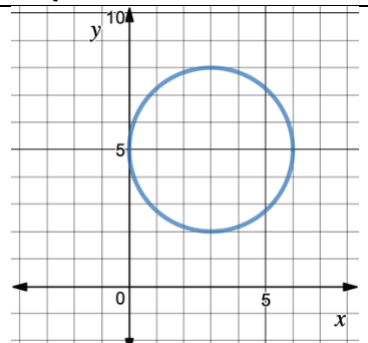
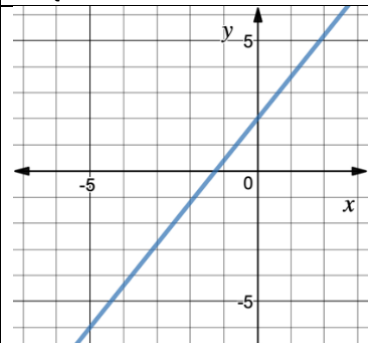
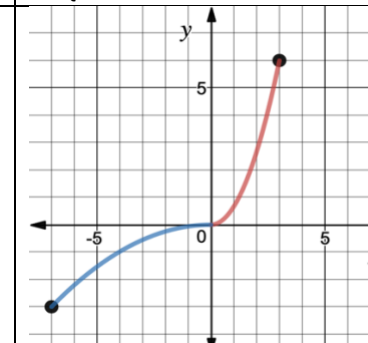
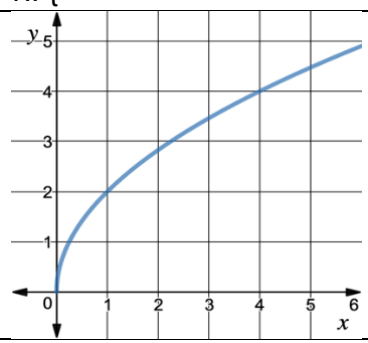
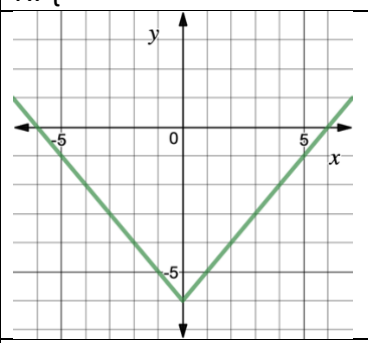
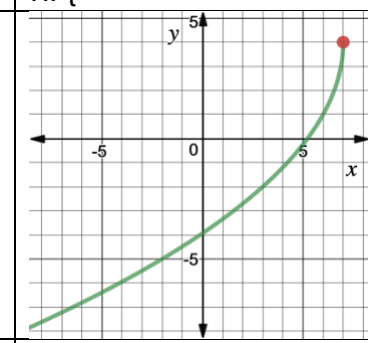
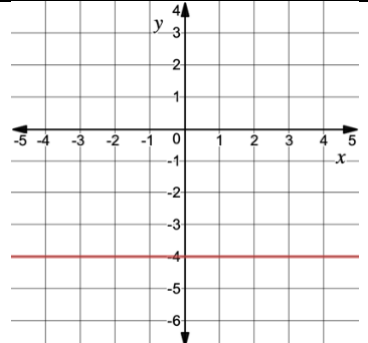
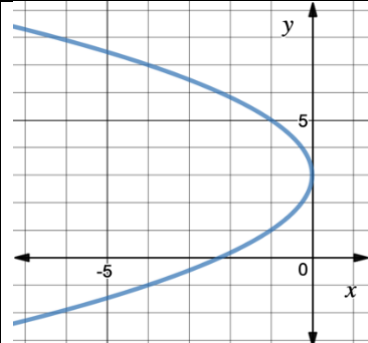
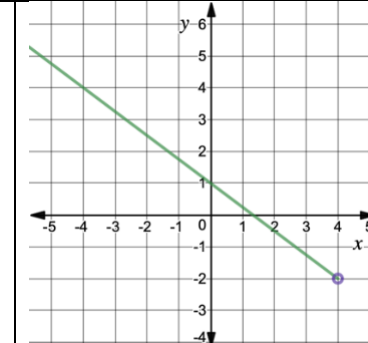
  - Express the area function for the three pens together, in terms of  $x$ , where  $x$  is the length of each pen.
  - Determine the domain and range for the area function.
- Determine the domain and range of each relation. Use a graph to help you if necessary.
  - $y = -x + 3$
  - $y = (x + 1)^2 - 4$
  - $y = -3x^2 + 1$
  - $x^2 + y^2 = 9$
  - $y = \frac{1}{x+3}$
  - $y = \sqrt{2x + 1}$
- For each function, determine  $f(4)$ ,  $f(-5)$ , and  $f\left(-\frac{2}{3}\right)$ .
  - $f(x) = \frac{2}{5}x + 11$
  - $f(x) = -6$
  - $f(x) = \frac{1}{x}$
  - $f(x) = \sqrt{x + 5}$
- State the domain and the range of each relation. Is each relation a function? Explain.
  - $\{(5, 5), (6, 6), (7, 7), (8, 8), (9, 9)\}$
  - $\{(3, -1), (4, -1), (5, -1), (6, -1)\}$
  - $\{(1, 6), (1, -14), (1, 11), (1, -8), (1, 0)\}$
  - $\{(1, 5), (4, 11), (3, 9), (5, 1), (11, 4)\}$
  - $\{(3, 2), (2, 1), (1, 0), (2, -1), (3, -2)\}$
- The domain and range of some relations are given. Each relation consists of five points. Is each a function? Explain.
  - $D: \{1, 2, 3, 4, 5\}$   $R: \{4\}$
  - $D: \{-3, -1, 1, 3, 5\}$   $R: \{2, 4, 6, 8, 10\}$
  - $D: \{2, 3, 6\}$   $R: \{-4, 6, 7, 11, 15\}$
  - $D: \{-2\}$   $R: \{9, 10, 11, 12, 13\}$
- Describe the graph of a relation that has
  - one entry in the domain and one entry in the range.
  - one entry in the domain and many entries in the range.
  - many entries in the domain and one entry in the range.

Challenge: Given  $f(x) + 2g(x) = 12x^2 + 3x + 8$  and  $2f(x) + 3g(x) = 18x^2 + 6x + 13$ , find the value of  $f(2) + g(3)$ .

### U3D1 Worksheet Part B Functions, Relations, Domain & Range

1. State the Domain and Range of each of the given relations in the space provided.

**Assume the graphs drawn to the edge of the grid continue on infinitely.**

		
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R: {	R: {	R: {
		
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