Chapter 1.1: Functions

Learning Goal:

- Explain and differentiate function and relation
- Use vertical line test to verify if a relation is a function
- State domain and range of a given equation, graph, or word problem

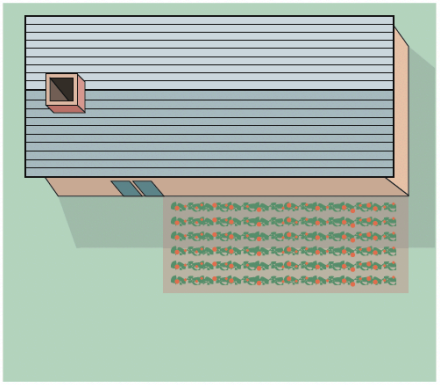
Watch the following video, then answer the questions.
https://www.youtube.com/watch?v=yJFbCBreRX8

Question 1:

Vitaly and Sherry have 24 m of fencing to enclose a rectangular garden at the back of their house.

a) Express the area of the garden as a function of its width.

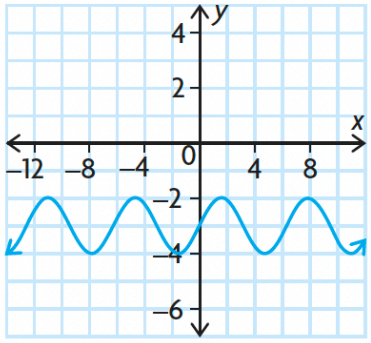
b) Determine the domain and range of the area function.



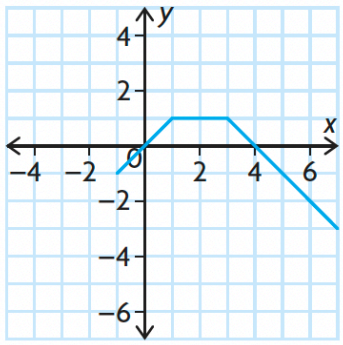
Question 2:

State the domain and range of each relation. Then determine whether the relation is a function, and justify your answer.

a)



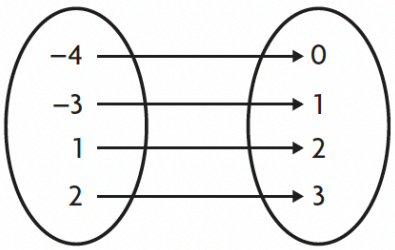
b)



c) $\{(1, 4), (1, 9), (2, 7), (3, -5), (4, 11)\}$

d) $y = 3x - 5$

e)



f) $y = -5x^2$

Chapter 1.3: Properties of Graphs of Functions

Learning Goal:

- Use different properties to describe functions: Line/point symmetry, end behaviour, interval of increase and decrease, even/odd functions, continuous functions,

Watch the following video, then answer the questions.
https://www.youtube.com/watch?v=u5Ge0AsVlsc

Question 1: In the following table, highlight the graphical characteristics that are unique to each function and could be used to distinguish it easily from other parent functions.

Parent Function	$f(x) = x$	$g(x) = x^2$	$h(x) = \frac{1}{x}$	$k(x) = \lvert x \rvert$	$m(x) = \sqrt{x}$	$p(x) = 2^x$	$r(x) = \sin x$
Sketch							
Domain							
Range							
Intervals of Increase							
Intervals of Decrease							
Location of Discontinuities and Asymptotes							
Zeros							
y-Intercepts							
Symmetry							
End Behaviours							

Question 2:

I: Each of the following situations involves a parent function whose graph has been translated. Draw a possible graph that fits the situation.

a) The domain is $\{x \in \mathbf{R}\}$, the interval of increase is $(-\infty, \infty)$, and the range is $\{f(x) \in \mathbf{R} \mid f(x) > -3\}$.

b) The range is $\{g(x) \in \mathbf{R} \mid 2 \leq g(x) \leq 4\}$.

c) The domain is $\{x \in \mathbf{R} \mid x \neq 5\}$, and the range is $\{h(x) \in \mathbf{R} \mid h(x) \neq -3\}$.

II: Sketch a possible graph of a function that has the following characteristics:

- $f(0) = -1.5$
- $f(1) = 2$
- There is a vertical asymptote at $x = -1$.
- As x gets positively large, y gets positively large.
- As x gets negatively large, y approaches zero.

III: **a)** $f(x)$ is a quadratic function. The graph of $f(x)$ decreases on the interval $(-\infty, -2)$ and increases on the interval $(2, \infty)$. It has a y-intercept at $(0, 4)$. What is a possible equation for $f(x)$?

b) Is there only one quadratic function, $f(x)$, that has the characteristics given in part a)?

c) If $f(x)$ is an absolute value function that has the characteristics given in part a), is there only one such function? Explain.

Homework:
Textbook pg28. #1, 3, 6 – 9