## Foundations of Functions Test Review Sheet

Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable.

1. The profit a company makes in thousands of dollars when advertising is represented by the function P(a) in the graph, where a is the amount of money the company spends on advertising, in thousands.

a. Evaluate p(16). What does this represent in terms of the profit the company will make?
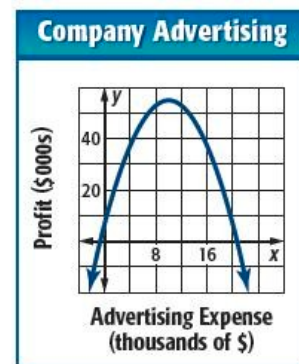
b. Evaluate p(4). What does this represent in terms of the profit the company will make?

Company Advertising

Profit ($000s)

Advertising Expense
(thousands of $)

c. Is p(26) greater than or less than zero?
What does this mean in terms of the company's finances?

d. What is the domain of the function on which the company will not lose money, and what does this mean?

e. What is the range of the function on the interval [0,22], and what does this represent?

2. Two items are on a balance scale. Their masses in grams are m_1 and m_2 respectively. The first object is x inches away from the fulcrum (balance point), and the second item is 5 – x inches away from the fulcrum. For the scale to be in balance, $m_1d_1 = m_2d_2$. Write a function that could be used to determine the mass of the first item, given that the mass of the second item is 12 grams. Use the information in the table as a reference.

m_2	d_1	d_2
12	x	5 - x

3. Determine whether or not each relation is a function. Then state the domain and range for each.
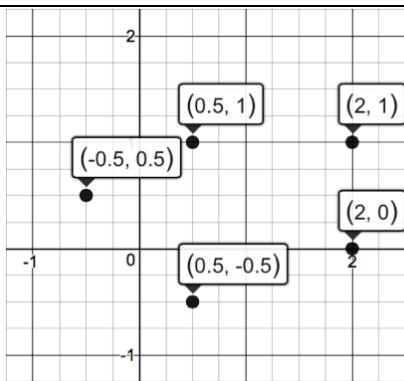
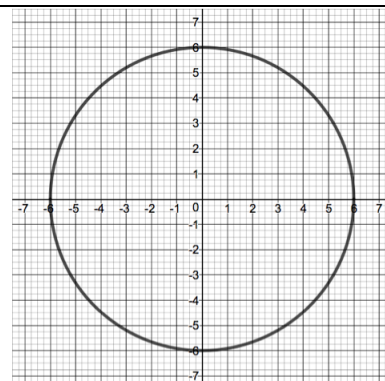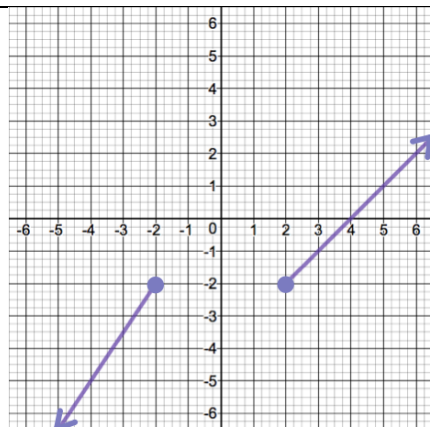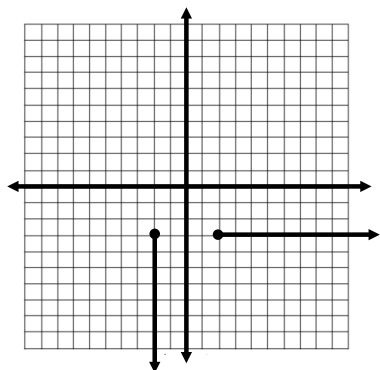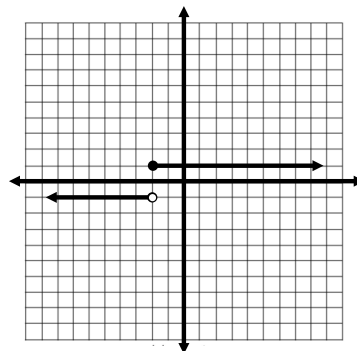|	
(0.5, 1) (2, 1) (-0.5, 0.5) (2, 0) (0.5, -0.5) a. Function: Domain: Range:	 b. Function: Domain: Range:
  c. Function: Domain: Range:	 d. Function: Domain: Range:
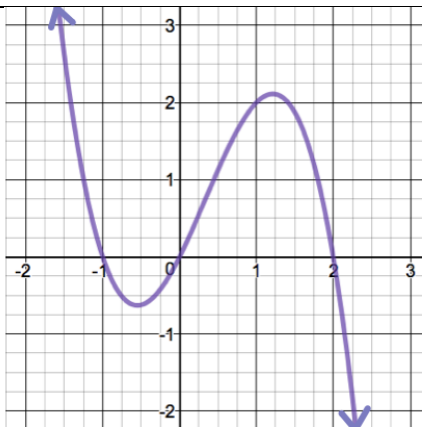
e.
Function:

Domain:

Range:

f.
Function:

Domain:

Range:

4. For a given function, p(x), the range is [-2,10) and the domain is (-6, 7].
Which of the following could NOT be characteristics of p(x)?

☐ p(-6) = 8   ☐ p(0) = -1   ☐ p(10) = 5   ☐ p(3) = -4   ☐ p(7) = -2

☐ p(5) = 5   ☐ p(-2) = 1   ☐ p(10) = 5   ☐ p(7) = -3   ☐ p(2) = 0

5. Complete each statement, provided with the graphs of g(x) the dashed line, and f(x) the solid line below.

a. g(0) = _____   b. f(___) = -7

c. (f – g)(4) = ____   d. $\left(\dfrac{g}{f}\right)(-8) =$ _____

e. h(x) is given by g(f(x)). Determine each of the following.

$(g \circ f)(-2) =$ _____   h(9) = _____

h(0) = _____   h(-1) = _____
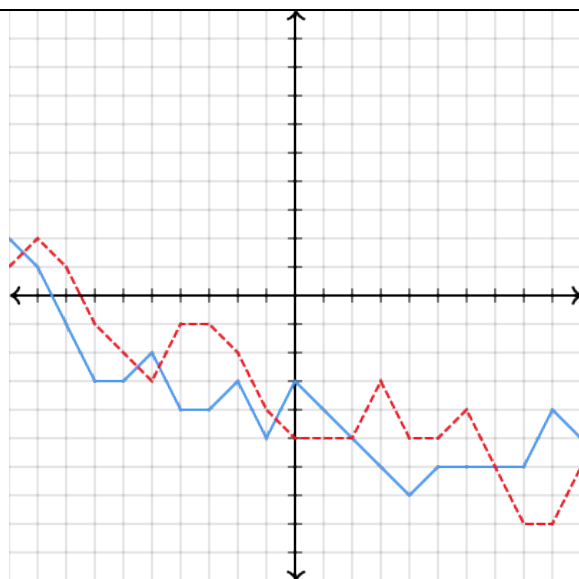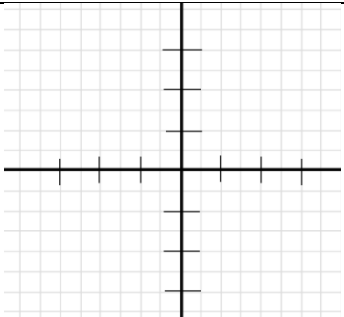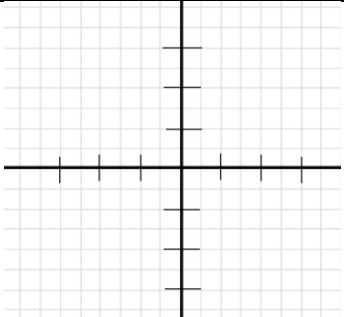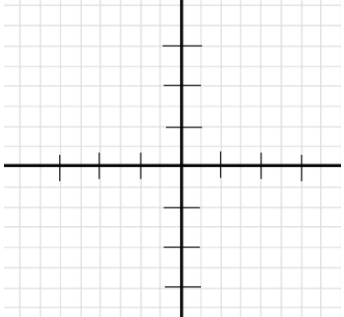
6. Sketch any function, f(x), that meets the constraints of each part. One of these will be impossible to create. For the impossible function, explain why it is impossible to create.

a. The domain is $(-\infty,2]$. The range is $y \geq 1$. f(-1) = 1.	
b. The domain is $(-2,\infty)$. The range is $y \leq 0$. f(0) = -3. f(x) is constant on the interval (-2,0).	
c. The domain is $(-\infty,\infty)$. The range is $y \geq -2$. f(2) = -3.	

7. Baumgartner went skydiving. His speed in meters per second is a function of the number of seconds after he jumped out of the plane, as pictured in the graph of f(s).

Speed as function of time
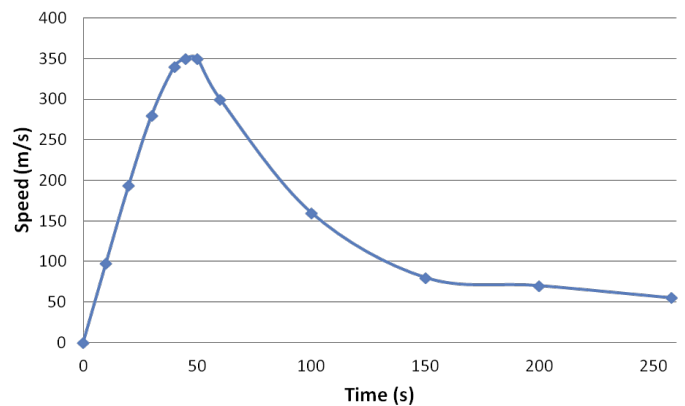
a. f(0) = _____.
What does this mean?

b. f(____) = 160.
What does this mean?

c. Do you think Baumgartner's speed will return to rest within 300 seconds? Explain.

8. Provided that $m(x) = -8x - 7$, $n(x) = \sqrt{3x^2 - 1}$, and $p(x) = x^3 - 9$, answer each question.

a. Which function has a domain that is NOT all real numbers?
What is the restriction on the domain of this function?

b. Determine $(m - p)(x)$.

c. Determine $(m \circ p)(x)$.

d. Determine $(m \bullet p)(-4)$.

e. Determine $(n \circ p)(0)$.

f. Which has the larger absolute value, $m(\text{-}5)$, or $\text{-}p(\text{-}5)$?

6. a. Create **any** function equation, $r(x)$, for which $r(8) = 12$.

b. Create **any** function equation, $w(x)$, for which $w(2)$ is undefined.