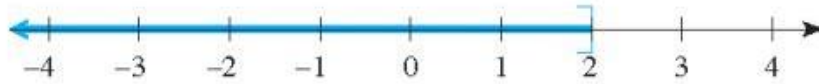


MTH 161, Practice Exam #1, Spring 2019

1. Translate the following graphs or expressions into appropriate interval notation.



- a.
b. t is between -2 and 8, including 8 but not -2.

2. Give an example of a cubic function shifted 3 units right and 2 units up and is narrower than $y = x^3$.
3. If (4,1) is a point on the graph of $f(x)$, which point must be on the graph of $y = 2f(-x)$?
4. Given $f(x) = 4e^{2x+11} - 10$, find two functions $f(x)$ and $g(x)$ such that $(f \circ g)(x) = h(x)$.

5. Sketch the left side of the graph to show a function with y-axis symmetry.

6. Consider the function $f(x) = -x^2 + 3x - 11$. Find an expression or the difference quotient $\frac{f(x+h)-f(x)}{h}$. Simplify completely.

7. Suppose that $f(x) = x^2 - 1$, $g(x) = \sqrt{2-x}$. Which of the following is the value of $(fg)(0)$?

- a. 0
b. 2
c. $\sqrt{2}$
d. $-\sqrt{2}$

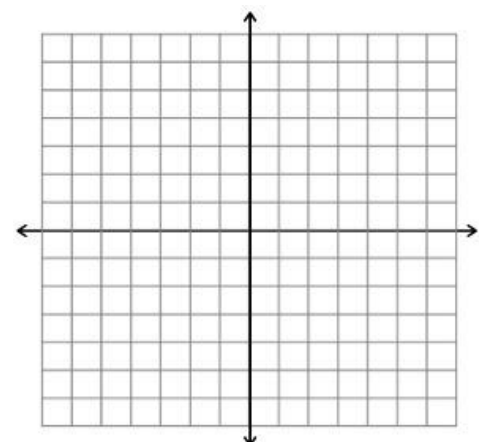
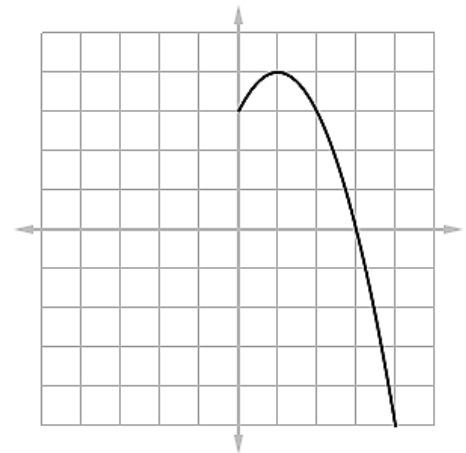
8. Check for symmetry: x-axis, y-axis, origin.

- a. $x^2 - xy + y^2 = 4$
b. $x = y^2 - 2$

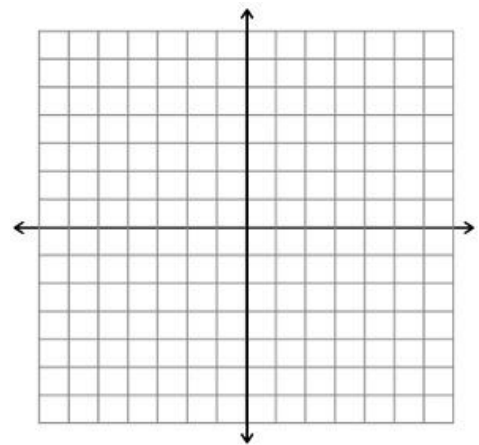
9. Consider the piecewise function $f(x) = \begin{cases} 2x + 1, & x > 0 \\ -x - 2, & x \leq 0 \end{cases}$

find:

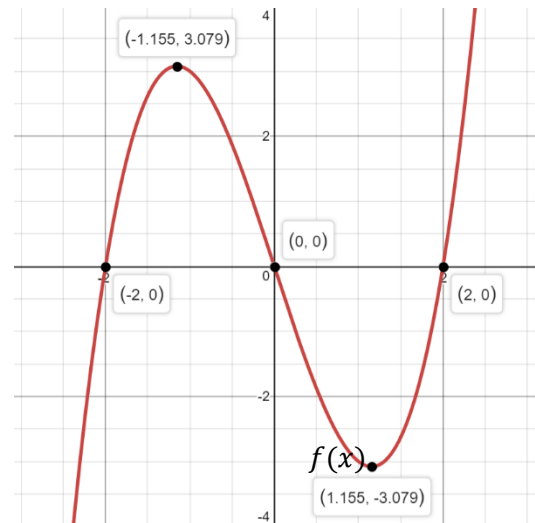
- a. $f(0)$
b. $f(2)$
c. X-intercept(s)
d. Y-intercept
e. Graph the function
f. Domain
g. Range



10. Suppose that $s(t) = \sqrt{3 - t^2}$, $u(t) = \frac{t}{t-4}$.
- Find $(s \circ u)(t)$
 - Write the domain in proper set notation.
11. Let f be a function such that $f(2) \geq f(x)$ for all x in $(-4, 3)$.
- Does f represent a relative min or max? Explain.
 - Sketch a possible graph of f that follows your explanation.
12. Does the equation $x = y^3 - 4y$ represent a function?
13. Find the domain of $f(x) = \frac{x-1}{\sqrt[3]{x+1}}$.



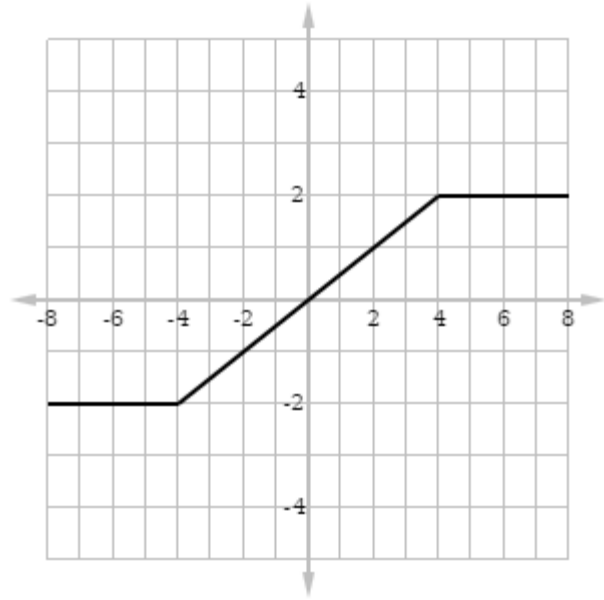
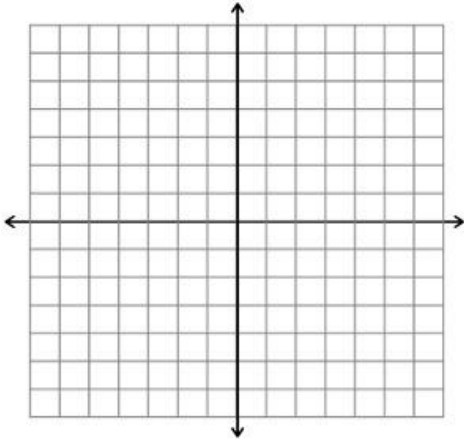
14. Consider the graph to the right.
- Identify coordinates of any relative maxima or minima.
 - On what intervals is f increasing?
 - On what intervals is f decreasing?
15. A department store marks up the price of a power drill by 75% of the price of the manufacturer. The price, $P(x)$, in dollars, to a customer after a 6% sales tax is $P(x) = (x + 0.75x) + 0.06(x + 0.75x)$.
- Simplify completely.
 - Evaluate $P(97)$ and interpret the meaning in the context of the problem.



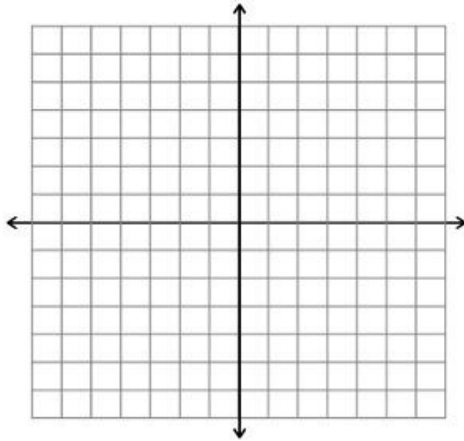
16. Which of the following statements is true?
- A function h is even if $f(-x) = -f(x)$
 - A function h is odd if $-f(-x) = f(x)$
 - A function h is even if $f(x) = f(x^2)$
 - A function h is even if $f(x) = f(2x)$
17. Suppose that the graph of a function f is known. Then the graph of $y = -f(x)$ may be obtained by:
- Reflecting the graph over the x-axis
 - Reflecting the graph over the y-axis
 - Shifting the graph to the left by 1
 - Shifting the graph down by 1

18. Consider the graph of $f(x)$ to the right.

a. Sketch $y = -f\left(\frac{1}{2}x\right)$



b. Sketch $f(x + 1) + 2$



19. Consider $f(x) = x^3 - x$.

a. Is f even, odd or neither?

b. Sketch the graph.

c. Verify your conjecture algebraically.

