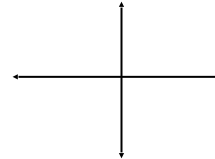


Math 1220 Test 1 Review

Distance, Midpoint, Lines, Circles

- Consider the points $P(-5,5)$ and $Q(3,1)$.
 - Find the distance between P and Q.
 - Find the midpoint of the line segment connecting P and Q.
 - Find the equation of the line that goes through P and Q.
 - Find the equation of a horizontal line that goes through P.
 - Find the equation of a vertical line that goes through Q.
 - If P and Q are ends of a diameter of a circle, write the equation of the circle in standard form.
- Determine if the points $A(-2,1)$, $B(2,3)$, $C(3,1)$ are the vertices of a right triangle.
- Write the equation of the circle $2x^2 + 2y^2 + 16x - 12y + 16 = 0$ in standard form.

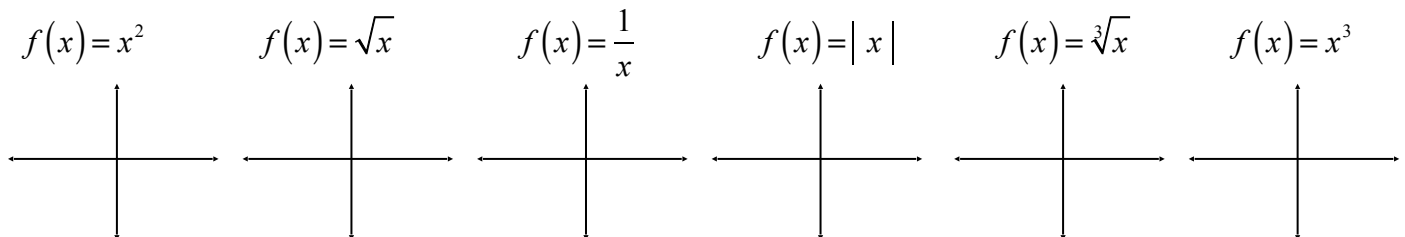
- Find the intercepts of $-4x+5y=40$. Use the intercepts to plot the line.



- Find the intercepts of $4x^2 + y^2 = 4$.

Graphing

- Graph each function



Domain

- Find the domain of each function. Write your answers in both set builder notation and interval form.

$$f(x) = \frac{x}{x^2 - 9} \quad f(x) = \sqrt{4 - 5x} \quad f(x) = \frac{x}{x^2 + 2x - 3} \quad f(x) = \frac{\sqrt{x+1}}{x^2 - 4} \quad f(x) = \frac{x}{\sqrt{x+8}} \quad f(x) = \frac{x-4}{x^2 + 1}$$

Difference Quotient

8. Let $f(x) = \frac{4}{x}$ and $g(x) = 4x - x^2$

Find (a) $\frac{f(1+h) - f(1)}{h}$

(b) $\frac{g(2+h) - g(2)}{h}$

Find (c) $\frac{f(x+h) - f(x)}{h}$

(d) $\frac{g(x+h) - g(x)}{h}$

Function Evaluation

9. For the function $f(x) = 2x^2 - 3x$, find

$f(3)$ $f(a^2)$ $f(-2)$ $f(x) + h$ $f(x+h)$ $f(3x)$

10. If $f(x) = \frac{Ax+5}{6x-2}$ and $f(1) = 4$, what is A?

Even/Odd

11. For each of the following functions, find $f(-x)$. Use that to determine if the functions even, odd, or neither

$f(x) = \frac{4+x^2}{1+x^4}$

$f(x) = 1 - x + x^3$

$f(x) = \frac{x}{1+x^2}$

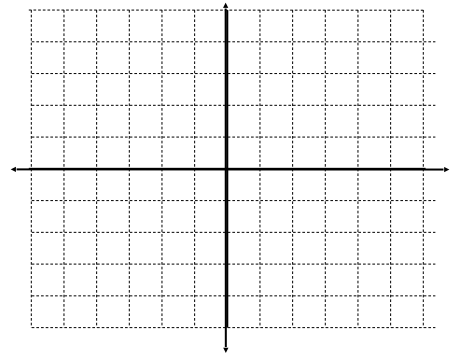
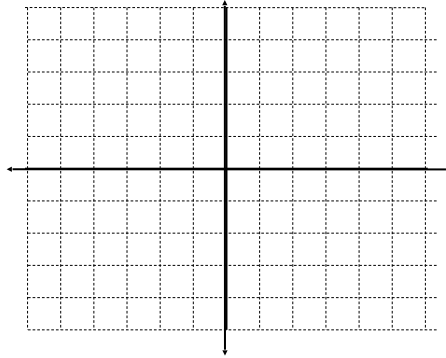
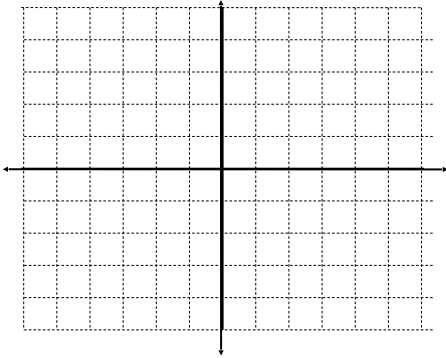
Piecewise Functions

12. Graph the following piecewise functions

$$f(x) = \begin{cases} 3x & \text{if } -2 < x \leq 1 \\ x+1 & \text{if } x > 1 \end{cases}$$

$$f(x) = \begin{cases} 2x+1 & \text{if } x < -1 \\ x-4 & \text{if } x \geq -1 \end{cases}$$

$$f(x) = \begin{cases} 4 & \text{if } x < -1 \\ x^2 & \text{if } -1 \leq x < 2 \\ 1-x & \text{if } 2 \leq x \leq 5 \end{cases}$$



Average Rate of Change

13. Find the average rate of change. Simplify your answer

$$f(x) = x^2 + 2x - 3 \text{ from } x = -1 \text{ to } x = 3$$

$$f(x) = \frac{3x}{x+1} \text{ from } x = -2 \text{ to } x = 2$$

Graphs and Equations.

14. The graphs of the functions f and g are given. Use the graph to answer the following questions.

(a) What is the domain and range of $f(x)$?

(b) Solve $f(x) < 0$.

(c) What is $(f + g)(1)$?

(d) If $x = -1$, what is $f(x)$?

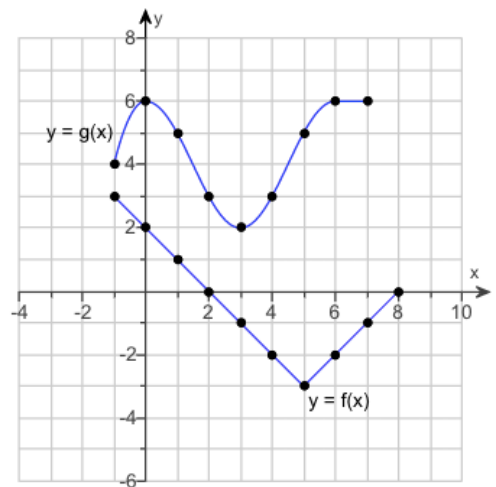
(e) For what values of x is $f(x) = -1$?

(f) What is $\left(\frac{g}{f}\right)(5)$?

(g) On what open intervals in x is $g(x)$ decreasing?

(h) What is the absolute maximum and minimum of $f(x)$?

(i) List the x intercepts of f . Give your answers as ordered pairs.



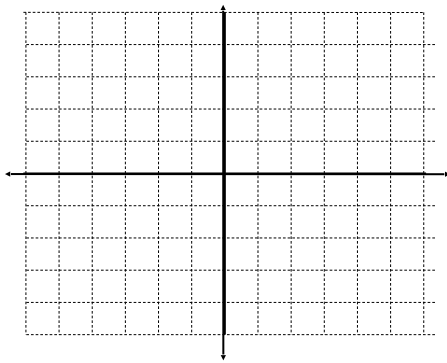
15. Suppose $f(x) = \frac{2x^2}{x^4 + 1}$

- a. Is the point $(-1,1)$ on the graph of f ?
- b. If $x = 2$, what is $f(x)$? What point is on the graph of f ?
- c. If $f(x) = 1$, what is x ? What point(s) are on the graph of f ?
- d. What is the domain of f ?
- e. List any x or y intercepts on the graph of f . Write your answers as ordered pairs.

Transformations

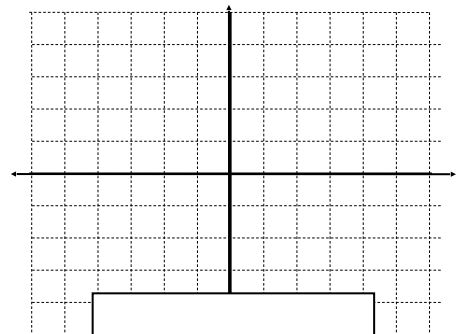
16. Graph each of the following functions using transformations. On the final graph, label ALL important features. Give the domain, range, intercepts (if any).

$f(x) = \sqrt{x-1} + 3$



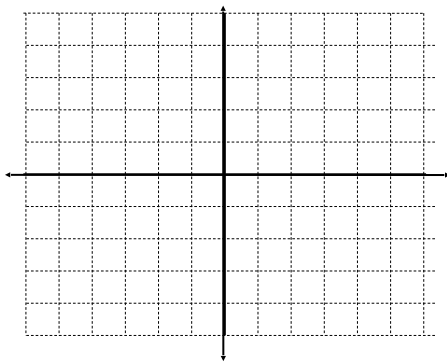
D: _____
 R: _____
 x-int(s): _____
 y-int(s): _____

$f(x) = \sqrt{1-x}$



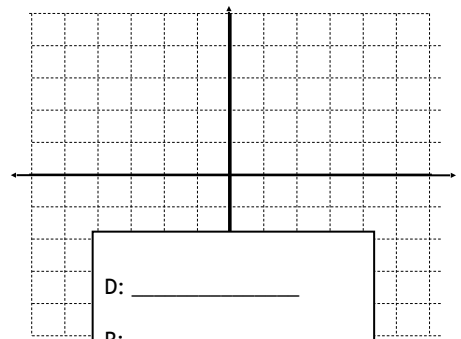
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 y-int(s): _____

$f(x) = (x-1)^2 + 2$



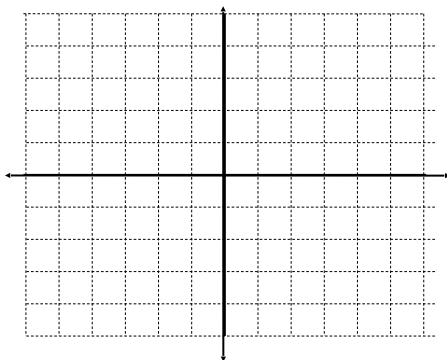
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 R: _____
 x-int(s): _____
 y-int(s): _____

$f(x) = 2|x|$



D: _____
 R: _____
 x-int(s): _____
 y-int(s): _____

$f(x) = -|x+3| + 2$



D: _____
 R: _____
 x-int(s): _____
 y-int(s): _____