

College Algebra

Test 2

Form A

Spring 2016

Name: _____

Date: _____

READ THESE INSTRUCTIONS CAREFULLY!

- Circle or underline your final written answer.
- Justify your reasoning and show your work.
- If you run out of space, make a note and continue your work on the back of a page.

Algebra Facts

Quadratic Formula

If a , b , and c are real numbers and $a \neq 0$, then the solutions of the equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Absolute Value

- If $|E| = F$, then either $E = F$ or $E = -F$.
- If $|E| \leq F$, then both $E \leq F$ and $E \geq -F$.
- If $|E| \geq F$, then either $E \geq F$ or $E \leq -F$.

Geometry Formulas

Given points (x_1, y_1) and (x_2, y_2) , the distance between them is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2},$$

their midpoint is

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right),$$

and the slope between them is

$$\frac{y_2 - y_1}{x_2 - x_1}.$$

Circles

The circle having center (h, k) and radius r is given by the equation

$$(x - h)^2 + (y - k)^2 = r^2$$

Lines

The **standard form** equation of a line looks like

$$ax + by + c = 0,$$

where a , b , and c are constants. The **slope-intercept form** is

$$y = mx + b,$$

where m is the slope of the line and b the y -intercept. The **point-slope form** is

$$y - y_0 = m(x - x_0),$$

where m is the slope and (x_0, y_0) is any point on the line.

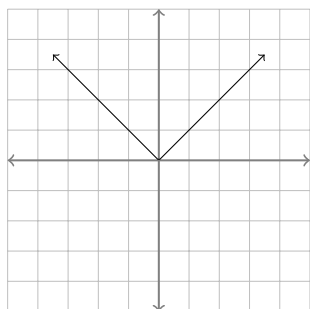
Transformations

$$\begin{array}{lll} x & \mapsto & x - h & \text{Horizontal Shift} \\ y & \mapsto & y - k & \text{Vertical Shift} \end{array}$$

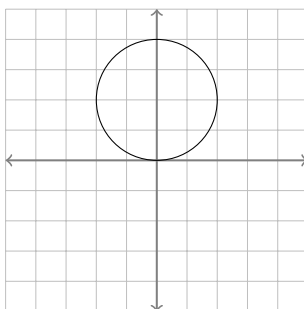
$$x \mapsto \frac{1}{a}x \quad \text{Horizontal Stretch}$$

$$y \mapsto \frac{1}{b}y \quad \text{Vertical Stretch}$$

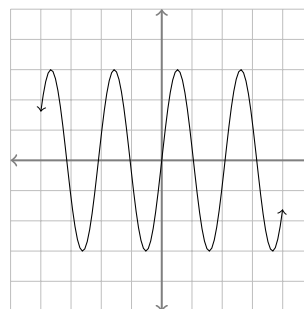
1. (10 pts.) Determine whether or not the following graphs are symmetric across the x -axis, across the y -axis, or about the origin.



x -axis: yes/no
 y -axis: yes/no
 origin: yes/no



x -axis: yes/no
 y -axis: yes/no
 origin: yes/no



x -axis: yes/no
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 origin: yes/no

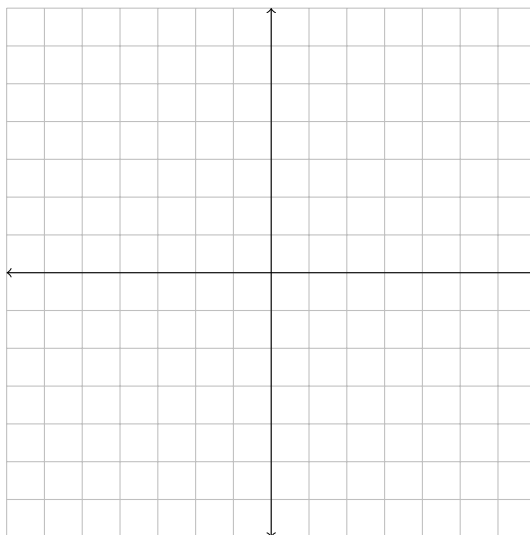
2. (10 pts.) Evaluate the function

$$f(x) = \begin{cases} 2x - 3 & \text{if } x \geq 2 \\ \frac{1}{x^2 - 5} & \text{if } x < 2 \end{cases}$$

at $x = 1$, $x = 9$, and $x = -7$.

3. (10 pts.) Sketch the graph of the following equation in the space provided.

$$(x + 5)^2 + (y + 2)^2 = 1$$



4. (10 pts.) Find the domain of the following function.

$$f(x) = \frac{9x^3 + x^2 + 3x + 7}{x^2 - 2x - 8}$$

5. (10 pts.) Determine whether or not the following equations are symmetric across the x -axis, across the y -axis, about the origin, or none of the three.

(a) $y^3 = xy - 3$

(b) $x^4 + y^4 = 1$

(c) $x^3 = y^2 + 1$

6. (10 pts.) Find all solutions of the following inequality.

$$|5x + 3| + 10 \leq 28$$

7. (10 pts.) Let $f(x) = x^2 - 3$ and $g(x) = 2x - 5$. Find the following.

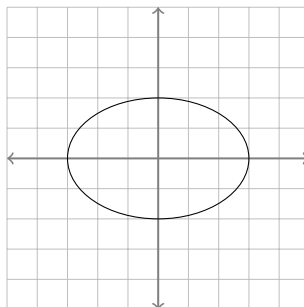
(a) $(f \circ g)(3)$

(b) $(g \circ f)(3)$

(c) $(f \circ g)(x)$

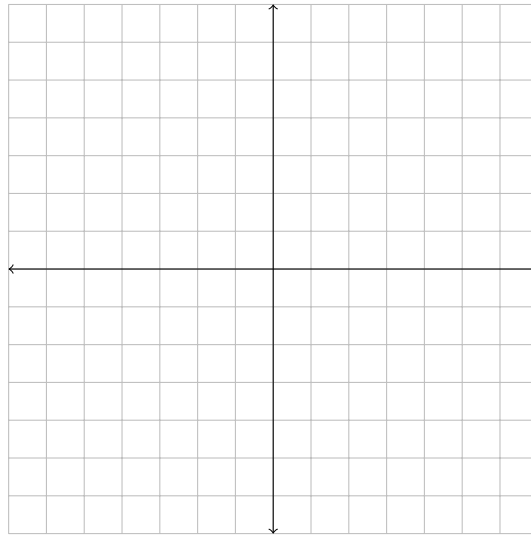
8. (10 pts.) Graphically transform the following graph in the space provided.

Shift right by 3 unit(s) and shift up by 1 unit(s).



9. (10 pts.) Sketch the graph of the following equation in the space provided.

$$\left(\frac{1}{2}(x-2)\right)^2 + (y+4)^2 = 4$$



10. (10 pts.) Find all solutions of the following inequality.

$$2|5x + 6| + 6 > 22$$

(Bonus.) Find the domain of the following function.

$$f(x) = \sqrt{|7x + 4| - 9}$$