College Algebra

Test 2

Form A

Spring 2017

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.

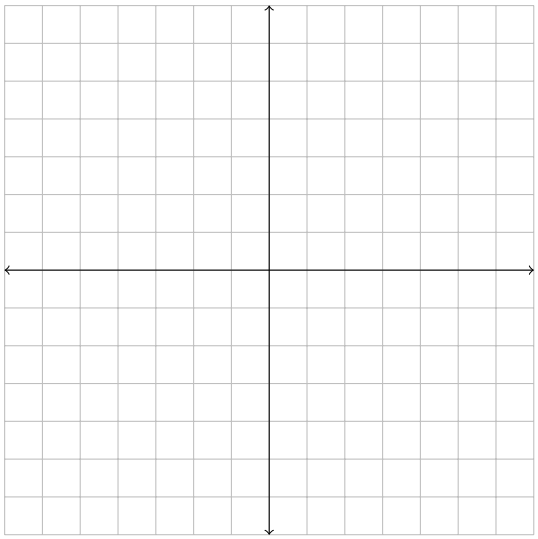
Transformations

x	$\mapsto$	$x - h$	Horizontal Shift
y	$\mapsto$	$y - k$	Vertical Shift
x	$\mapsto$	$\frac{1}{a}x$	Horizontal Stretch
y	$\mapsto$	$\frac{1}{b}y$	Vertical Stretch

1. (10 pts.) Find an equation for the line passing through the point $(-1, -2)$ and having slope -1/3.

2. (10 pts.) Find the distance between the points $(2, 3)$ and $(3, 4)$.

3. (10 pts.) Plot the graph of the linear equation $y = 2x + 3$ on the plane below.



4. (10 pts.) Find an equation for the line passing through the points $(7, 7)$ and $(-7, -2)$.

5. (10 pts.) Convert the standard form linear equation

$$5y + 6x = -1$$

to slope-intercept form.

6. (10 pts.) Find an equation in slope-intercept form for the line passing through the point $(2, 4)$ and parallel to $y = \frac{1}{2}x - 2$.

7. (10 pts.) Let $f(x) = 4x + 3$ and $g(x) = x^2 - 5$. Compute the following.

   (a) $(f \circ g)(-2)$

   (b) $(g \circ f)(-2)$

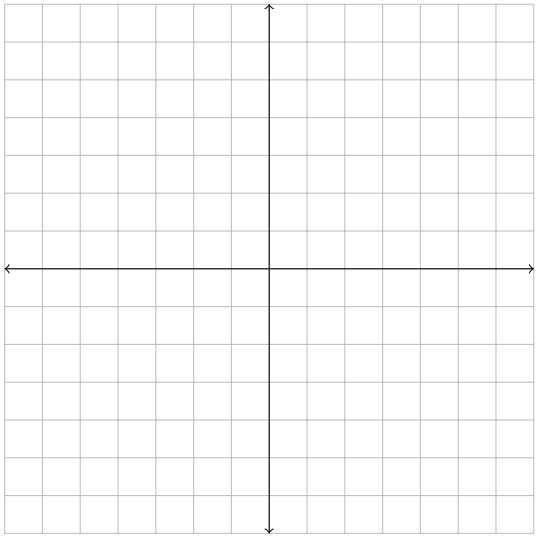
   (c) $(f \circ g)(x)$

8. (10 pts.) Find the domain of the following function.

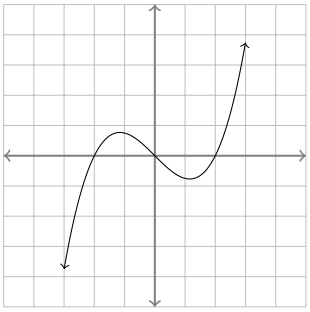
$$f(x) = \frac{5x^3 + x^2 + 5x + 4}{x^2 - 9}$$

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

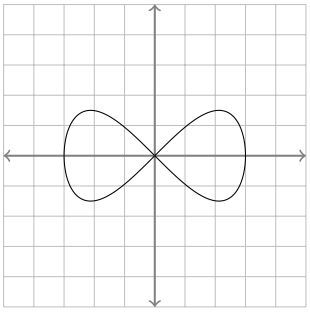
$$(x-5)^2 + (y+1)^2 = 1$$



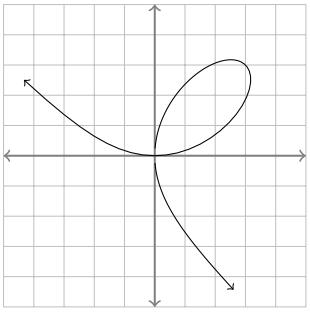
10. (10 pts.) Determine whether or not the following graphs are symmetric across the x-axis, across the y-axis, or about the origin.



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

(Bonus.) Find the inverse of $f(x) = 3x + 5$.