College Algebra

Test 1

Form A

Spring 2015

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 $E \leq -F$.

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.

Parabolas

The parabola with horizontal directrix, vertex at (h, k), and signed focal length p is given by the equation

$$y = \frac{1}{4p}(x - h)^2 + k.$$

This parabola opens up if $p > 0$ and down if $p < 0$.

Ellipses

The ellipse with foci at $(\pm c, 0)$ and major axis $2a$ is given by the equation

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

where $b^2 = c^2 - a^2$.

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

Solve the following equations.

1. $x^2 + 4x + 1 = 0$

2. $\dfrac{x}{x-3} + 3 = \dfrac{1}{x-3}$

3. $|4x + 12| + 20 = 18$

4. $x^2 - 9x + 20 = 0$

5. $|-3x-1|+5=19$

6. $3x^2-16x+21=0$

7. $x^3-12x^2+27x=0$

8. $|x^2-6x+10|=2$

Solve the following inequalities and graph your solutions. Give your answers in interval notation.

9 $|3x - 8| + 12 \leq 16$

10 $2|-3x + 4| + 9 \geq 19$

Bonus. Solve. $2x^4 - 7x^2 - 15 = 0$