

# 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

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## 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

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

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

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

Solve the following equations.

1.  $x^2 - 10x - 2 = 0$

2.  $\frac{x}{x+2} + 3 = \frac{1}{x+2}$

3.  $|4x - 7| + 5 = -3$

4.  $x^2 - 6x + 5 = 0$

5.  $|-2x + 3| + 7 = 24$

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

7.  $x^3 + 2x^2 - 24x = 0$

8.  $|x^2 - 5x + 7| = 1$

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

$$9 \leq -5x - 7 \leq 16$$

$$10 \leq 2|5x - 4| + 7 \leq 23$$

Bonus. Solve.  $2x^4 - 5x^2 - 25 = 0$