

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

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

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

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

Solve the following equations.

1. $x^2 + 8x + 4 = 0$

2. $\frac{x}{x+3} + 5 = \frac{3}{x+3}$

3. $|-14x + 9| + 14 = 1$

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

5. $|4x - 4| + 7 = 27$

6. $3x^2 - 5x + 2 = 0$

7. $x^3 + x^2 - 56x = 0$

8. $|x^2 + 3x - 6| = 4$

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

9 $|5x + 1| + 8 \leq 14$

10 $2|5x + 9| + 5 \geq 24$

Bonus. Solve. $2x^4 + x^2 - 3 = 0$