

Math 105, Precalculus
 Quiz 2, Sections 1.7, 1.8, 1.10

Name ANSWER KEY A
 September 17, 2009

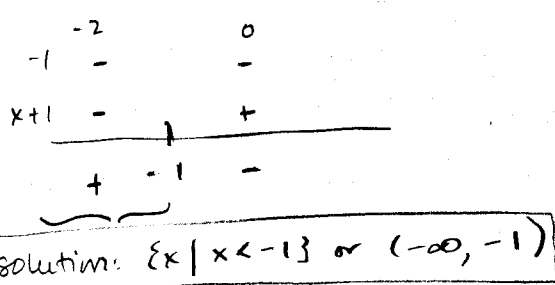
Please show all work neatly. Use of calculators is NOT permitted.

1. Solve the inequality: $\frac{x}{x+1} > 1$.

3 points
 $\frac{x}{x+1} - 1 > 0$

$$\frac{x}{x+1} - \frac{(x+1)}{(x+1)} = \frac{x-x-1}{x+1} = \frac{-1}{x+1} > 0$$

Let $x+1 = 0$; $x = -1$



2. Use the points $P(-1,1)$ and $Q(2,7)$ to answer parts a-c below.

a) Which of the points is closer to the point $S(-2,5)$?

Use distance formula: $d = \sqrt{(-1 - (-2))^2 + (1 - 5)^2} = \sqrt{1^2 + (-4)^2} = \sqrt{17}$

$$d = \sqrt{(2 - (-2))^2 + (7 - 5)^2} = \sqrt{4^2 + 2^2} = \sqrt{20}$$

2'hr
 Conclusion: point P is closer.

b) Find the equation (in slope-intercept form) of the line through P and Q .

slope = $m = \frac{7-1}{2-(-1)} = \frac{6}{3} = 2$

I: solve for b.
 $1 = 2(-1) + b = -2 + b$
 $b = 3$

or II.
 $y - 1 = 2(x + 1) = 2x + 2$

$y = 2x + 3$

$\Rightarrow y = 2x + 3$ (choose either point)

c) Find the equation (in slope-intercept form) of the line **perpendicular** to the line in part b, and through the point $(4, 4)$.

$m_{\perp} = -\frac{1}{2}$

I. $4 = -\frac{1}{2}(4) + b = -2 + b$
 $b = 6$

or $y - 4 = -\frac{1}{2}(x - 4) = -\frac{1}{2}x + 2$

$y = -\frac{1}{2}x + 6$

$\Rightarrow y = -\frac{1}{2}x + 6$

3. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$$x^2 + y^2 - 14x + 45 = 0$$

$$x^2 - 14x + y^2 = -45$$

$$x^2 - 14x + 49 + y^2 = -45 + 49$$

$$(x-7)^2 + y^2 = 4$$

$$b = -14$$

$$\frac{b}{2} = \frac{-14}{2} = -7$$

$$\left(\frac{b}{2}\right)^2 = (-7)^2 = 49$$

Equation of a circle,
 with center = $(7, 0)$
 radius = $\sqrt{4} = 2$

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Name Answer Key B
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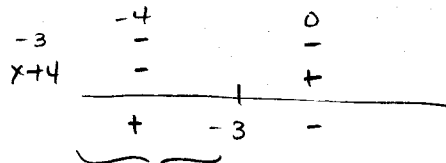
Please show all work neatly. Use of calculators is NOT permitted.

1. Solve the inequality: $\frac{x}{x+3} > 1$.

$$\frac{x}{x+3} - 1 > 0$$

$$\frac{x}{x+3} - \frac{(x+3)}{(x+3)} = \frac{x-x-3}{x+3} = \frac{-3}{x+3} > 0$$

Let $x+3 = 0$; $x = -3$



solution: $\{x \mid x < -3\}$ or $(-\infty, -3)$

2. Use the points $P(-1,1)$ and $Q(1,5)$ to answer parts a-c below.

a) Which of the points is closer to the point $S(-3,4)$?

Use distance formula: $d = \sqrt{(-1 - (-3))^2 + (1 - 4)^2} = \sqrt{2^2 + (-3)^2} = \sqrt{4 + 9} = \sqrt{13}$

$$d = \sqrt{(-3 - 1)^2 + (4 - 5)^2} = \sqrt{(-4)^2 + (-1)^2} = \sqrt{16 + 1} = \sqrt{17}$$

Point P is closer.

b) Find the equation (in slope-intercept form) of the line through P and Q .

$$m = \frac{5-1}{1-(-1)} = \frac{4}{2} = 2$$

I. Solve for b
 $1 = 2(-1) + b = -2 + b$
 $b = 3$

OR $y - 5 = 2(x - 1) = 2x - 2$

$$y = 2x + 3$$

(choose either point)

c) Find the equation (in slope-intercept form) of the line perpendicular to the line in part b, and through the point $(4, 4)$.

$$m_{\perp} = -1/2$$

solve for b:

$$4 = -1/2(4) + b = -2 + b$$

$$b = 6$$

$$\therefore y = -1/2x + 6$$

OR $y - 4 = -1/2(x - 4) = -1/2x + 2$

$$y = -1/2x + 6$$

3. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$$x^2 + y^2 - 12y + 27 = 0$$

$$x^2 + y^2 - 12y = -27$$

$$x^2 + y^2 - 12y + 36 = -27 + 36$$

$$x^2 + (y - 6)^2 = 9$$

$$b = -12$$

$$\frac{b}{2} = \frac{-12}{2} = -6$$

$$\left(\frac{b}{2}\right)^2 = 36$$

Equation of a circle
 with center $(0, 6)$
 radius $= \sqrt{9} = 3$.