

Solve the equation. Identify the equation as an identity, an inconsistent equation, or a conditional equation.

5 1.  $\frac{1}{m-2} - \frac{2}{m+2} = \frac{4}{m^2-4}$       LCD =  $(m-2)(m+2)$        $-m = -2$

~~$m = 2$  or  $m \in \{2\}$~~

But  $m = 2 \notin D$

**No sol'n**

$$\frac{m+2 - (2(m-2))}{LCD} = \frac{4}{LCD}$$

$$m+2 - 2m + 4 = 4$$

$$-m + 6 = 4$$

Solve the absolute value equation.

5 2.  $\frac{1}{5}|x-13| = 20$

$$|x-13| = 100$$

$$x-13 = \pm 100$$

$$x = 13 \pm 100$$

$$\rightarrow x = 113$$

OR

$$x = -87$$

$$\{-87, 113\}$$

50  
40

Solve the problem.

5 3. Tim and Judy mix two kinds of feed for pedigreed dogs. They wish to make 20 pounds of feed worth \$0.41 per pound by mixing one kind worth \$ 0.35 per pound with another worth \$0.55 per pound. How many pounds of the cheaper kind should they use in the mix? (Round to the nearest pound.)

Let  $x =$  the # of pounds of cheap stuff.

	cheap	Spandy	Mix
TOTAL	$x$	$20-x$	20
\$	$.35x$	$.55(20-x)$	$.41(20)$
	$.35x + .55(20-x) = 8.2$		
	$.35x + 11 - .55x = 8.2$		
	$-.2x = -2.8$		

$$x = \frac{-2.8}{-.2} = 14 \text{ lbs}$$

$$x = 14$$

check:

$$(.35)(14) + .55(6) = 8.2 \checkmark$$

- 5 4. One maid can clean the house in 6 hours. Another maid can do the job in 5 hours. How long will it take them to do the job working together?

$$\frac{1}{6} + \frac{1}{5} = \frac{1}{x}, \text{ where}$$

$x = \text{time, in hours, to finish job together.}$

$$5x + 6x = 30$$

$$11x = 30$$

$$x = \frac{30}{11}$$

$$= 2.\overline{72} \text{ hrs, } 43.\overline{636} \text{ minutes}$$

$$\approx 2 \text{ hrs, } 44 \text{ min.}$$

Graph the equation.

(Complete the square for 5 pts. Graph for 5 pts.)

5 5.  $x^2 + y^2 + 6x + 4y + 9 = 0$

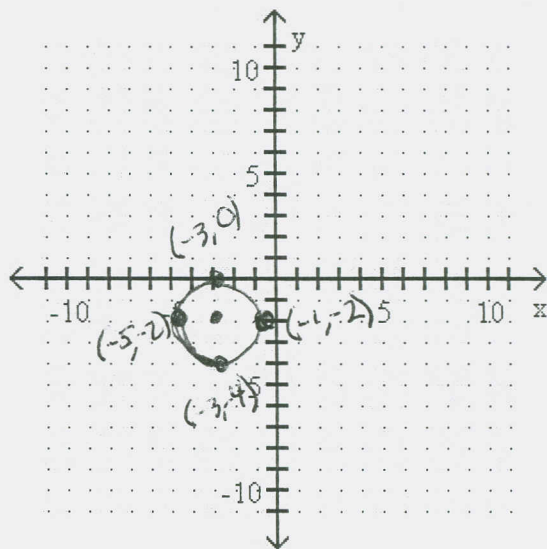
→ Bonus.

$$x^2 + 6x + y^2 + 4y = -9$$

$$x^2 + 6x + 3^2 + y^2 + 4y + 2^2 = -9 + 9 + 4$$

$$(x+3)^2 + (y+2)^2 = 4$$

$$(h, k) = (-3, -2), r = 2$$



Find the equation of the line through the given pair of points.

5 6.  $(-7, -8), (-4, 7)$

$$m = \frac{7 - (-8)}{-4 - (-7)} = \frac{15}{3} = 5$$

$$y = m(x - x_1) + y_1$$

$$y = 5(x - (-7)) - 8$$

$$= 5x + 35 - 8$$

$$= 5x + 27$$

5 (5 pts) Point-Slope Form:  $y = 5(x + 7) - 8$

5 (5 pts) Slope-Intercept Form:  $y = 5x + 27$

$$y = 5(x + 4) + 7$$

Write an equation in standard form using only integers for the line described.

5 7. The line through  $(0, 2)$ , perpendicular to  $y = \frac{3}{2}x + 2$

$$m = \frac{3}{2} \Rightarrow m_{\perp} = -\frac{2}{3}$$

$$y = -\frac{2}{3}(x - 0) + 2$$

$$y = -\frac{2}{3}x + 2$$

$$3y = -2x + 6$$

$$\boxed{2x + 3y = 6}$$

Solve the equation by factoring.

5 8.  $y^2 + 14y = -45$

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

$$(y + 5)(y + 9) = 0$$

$$\boxed{y \in \{-9, -5\}}$$

Use the square root property to find all real or imaginary solutions to the equation.

5 9.  $(x-8)^2 = 64$

$$x-8 = \pm 8$$

$$x = 8 \pm 8$$

$$x \in \{0, 16\}$$

→ "no real" is better.

Find the real or imaginary solutions by completing the square.

5 10.  $x^2 + 4x + 40 = 0$

$$x^2 + 4x = -40$$

$$x^2 + 4x + 2^2 = -40 + 4$$

$$(x+2)^2 = -36$$

$$x+2 = \pm \sqrt{-36} = \pm 6i$$

$$x = -2 \pm 6i$$

$$x \in \{-2-6i, -2+6i\}$$

State the value of the discriminant and the number of real solutions.

5 11.  $5y^2 = -3y - 7$

$$5y^2 + 3y + 7 = 0$$

$$a=5, b=3, c=7$$

$$b^2 - 4ac = 3^2 - 4(5)(7) \text{ is negative.}$$

No real solutions

$$= 9 - 140 = -131 = \text{Discriminant}$$

Find the real or imaginary solutions by using the quadratic formula.

5 12.  $3x^2 + 12x = -2$

$$3x^2 + 12x + 2 = 0$$

$$a=3, b=12, c=2$$

$$b^2 - 4ac = 12^2 - 4(3)(2)$$

$$= 144 - 24$$

$$= 120$$

$$x = \frac{-12 \pm 2\sqrt{30}}{2(3)}$$

$$= \frac{-6 \pm \sqrt{30}}{3} = -\frac{6 \pm \sqrt{30}}{3}$$

$$\begin{array}{r} 2 \overline{)120} \\ \underline{2} \phantom{0} \\ 2 \phantom{0} \\ \underline{2} \phantom{0} \\ 3 \phantom{0} \\ \underline{3} \phantom{0} \\ 5 \end{array}$$

$$\sqrt{120} = 2\sqrt{30}$$

$$x \approx .8257418584$$

OR

$$x \approx -2.825741858$$

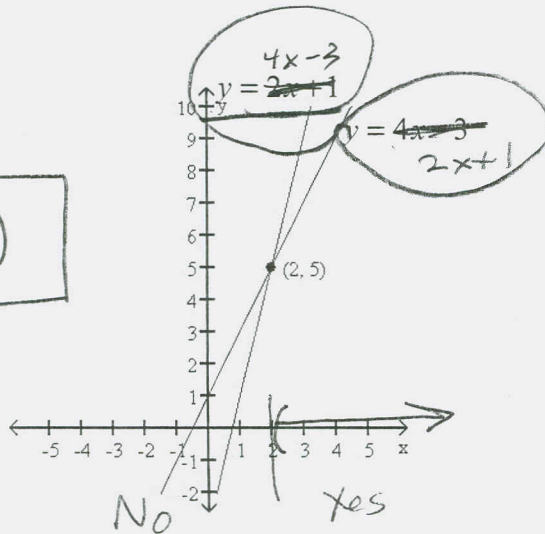
$$\left\{ \frac{-6 \pm \sqrt{30}}{3} \right\}$$

Solve the inequality by reading the graph. Give your answer in set-builder notation AND interval notation.

5 13.  $4x - 3 > 2x + 1$

$$x \in (2, \infty)$$

$$= \{x \mid x > 2\}$$



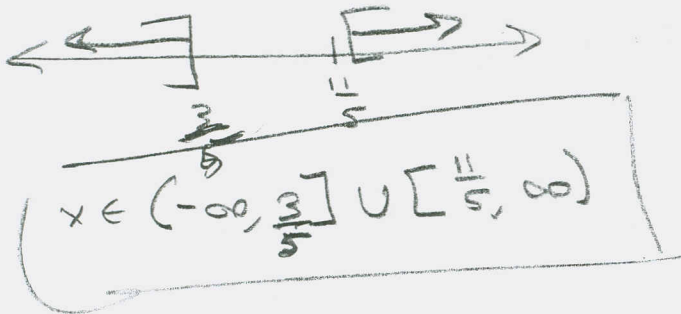
Solve the absolute value inequality. Write the solution set using interval notation.

5 14.  $|5x - 7| \geq 4$

$5x - 7 \geq 4$  OR  $5x - 7 \leq -4$

$5x \geq 11$  OR  $5x \leq 3$

$x \geq \frac{11}{5}$  OR  $x \leq \frac{3}{5}$



5 15.  $|9|x - 8| < 3$

$x - 8 < \frac{1}{3}$  and  $x - 8 > -\frac{1}{3}$

$3x - 24 < 1$

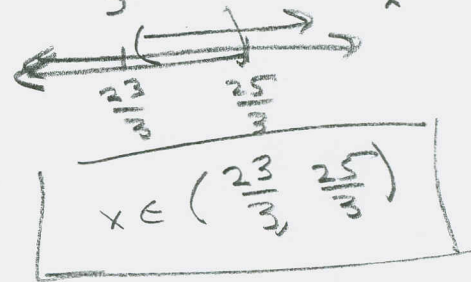
$3x < 25$

$x < \frac{25}{3}$

$3x - 24 > -1$

$3x > 23$

$x > \frac{23}{3}$



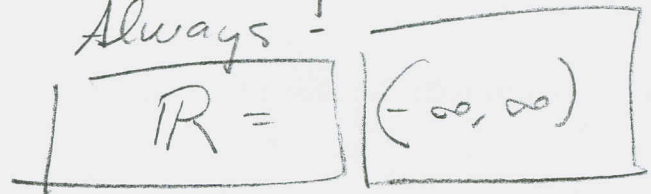
5 16.  $|19x - 7| < -5$

Never!



5 17.  $|19x - 7| > -5$

Always!



Find the values of x for which the expression is a real number.

5 18.  $\frac{1}{\sqrt{13-x}}$

Need  $13 - x \geq 0$  &  $\sqrt{13 - x} \neq 0$

$\implies$  Need  $13 - x > 0$

$13 > x$

