HW #14 - due Fri, 10/16
7.2 #11-21 odd, 43-51 odd, 57-65 odd, 85-91 odd, 97-103 odd,113-121 odd — Operations on Radical Expressions
8.2 #59-69 odd — Quadratic Equations

HW #15 - due Mon, 10/19
6.3 #17,23,25,33,41,43 — Complex Fractions
6.4 #9-31odd — Rational Equations

HW#16 - due Fri, 10/23
Handout: Old Test #4 from 2010
Handout: Practice Problems for Test #4

Test #4 - Friday, 10/23
on 5.7, 6.1, 6.2, 6.3, 6.4, 6.6, 7.2, 8.2

6. Simplify.

$\sqrt[3]{54x^4} = \sqrt[3]{27 \cdot 2 \cdot x^3 \cdot x^1}$

$= \sqrt[3]{3^3 \cdot 2 \cdot x^3 \cdot x}$

$= 3x\sqrt[3]{2x}$

21. Find the distance between the two points $(-8,-2),(-1,-5)$.

x_1, y_1 $\quad x_2, y_2$

$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$=\sqrt{(-1-(-8))^2+(-5-(-2))^2} = \sqrt{7^2+(-3)^2} = \sqrt{49+9} = \boxed{\sqrt{58}}$

22. Find the midpoint of the line segment connecting the two points $(-8,-2),(-1,-5)$

$(x_m, y_m) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{-8+(-1)}{2}, \frac{-2+(-5)}{2}\right)$

$= \boxed{\left(-9/2, -7/2\right)}$

24. Find the equation of the line with zero slope that passes through the point $(-8,-2)$

$y=-2$

Find the x- and y-intercepts of the function $6x+3y=12$.

26. x-intercept: $6x+3(0)=12$

$6x=12$

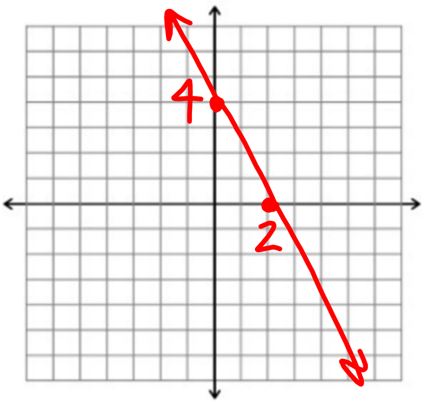
$x=2$ $\quad \boxed{(2,0)}$

27. y-intercept: $6(0)+3y=12$

$3y=12$

$y=4$ $\quad \boxed{(0,4)}$

28. Graph the function $6x+3y=12$.



$3y=-6x+12$

$y=-2x+4$

29. Find the equation of a line perpendicular to the line $6x + 3y = 12$ that passes through the point $(-1,2)$.

$3y = -6x + 12$

$y = -2x + 4$

$m = \frac{1}{2}$ $y - y_1 = m(x - x_1)$

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

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

$y = \frac{1}{2}x + \frac{1}{2} + \frac{4}{2}$

$\boxed{y = \frac{1}{2}x + \frac{5}{2}}$

30. Solve the equation $-5 - [4(x - 2) - 3(2x - 1)] = 2x$

$-5 - [4x - 8 - 6x + 3] = 2x$

$-5 - [-2x - 5] = 2x$

$-5 + 2x + 5 = 2x$

$-5 + 5 = 2x - 2x$

$0 = 0$

identity

$\boxed{(-\infty, \infty)}$

$\boxed{\text{all real numbers}}$

$\boxed{\mathbb{R}}$

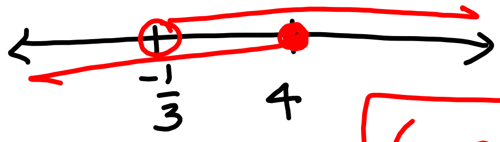
32. Solve the compound inequality. Give your answer in interval notation.

$5 - 3x < 6$ *or* $4x - 9 \le 7$

$-3x < 1$ $\quad \cup \quad$ $4x \le 16$

$x > -\frac{1}{3}$ $\quad\quad$ $x \le 4$

$\{x \mid x \in \mathbb{R}\}$



$\boxed{(-\infty, \infty)}$

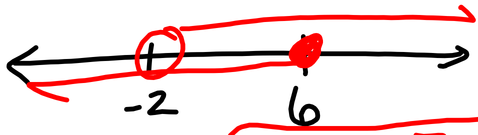
32. Solve the compound inequality. Give your answer in interval notation.

$3 - 2x < 7$ *and* $3x - 12 \le 6$

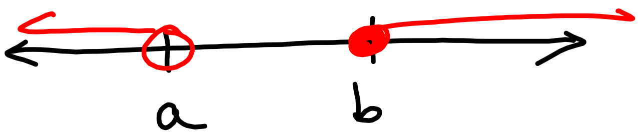
$-2x < 4$ $\quad \cap \quad$ $3x \le 18$

$x > -2$ $\quad\quad$ $x \le 6$

$\{x \mid -2 < x \le 6\}$



$\boxed{(-2, 6]}$



$\cup$: $(-\infty, a) \cup [b, \infty)$

$\cap$: $\varnothing$

$\{\varnothing\} \neq \varnothing$

38. List the values that must be excluded from the domain using the roster method.

$f(x) = \frac{(x-7)(x+9)}{(x+3)(x-8)}$

$\{-3, 8\}$

39. State the domain of the function using interval notation.

$f(x) = \frac{x+7}{x+9}$

$\{x \mid x \neq -9\}$

$\boxed{(-\infty, -9) \cup (-9, \infty)}$

40. List the range of the function using the roster method, where the domain is restricted to $\{-1,0,1\}$.

$f(x) = \frac{\sqrt{1+x}}{2-x}$

$f(-1) = \frac{\sqrt{1+(-1)}}{2-(-1)} = \frac{\sqrt{0}}{3} = \frac{0}{3} = 0$

$f(0) = \frac{\sqrt{1+0}}{2-0} = \frac{\sqrt{1}}{2} = \frac{1}{2}$

$f(1) = \frac{\sqrt{1+1}}{2-1} = \frac{\sqrt{2}}{1} = \sqrt{2}$

$\boxed{\{0, \frac{1}{2}, \sqrt{2}\}}$

7. Solve for x. Check your solutions.

$\frac{(x+2)(x+5)}{1} \cdot \left(\frac{3}{x+5}\right) = \left(\frac{5}{x+2} - \frac{9}{x^2+7x+10}\right) \cdot \frac{(x+2)(x+5)}{1}$

$(x+2)(x+5)$

$\frac{(x+2)\cancel{(x+5)}}{1} \cdot \frac{3}{\cancel{x+5}} = \frac{\cancel{(x+2)}(x+5)}{1} \cdot \frac{5}{\cancel{x+2}} - \frac{\cancel{(x+2)}\cancel{(x+5)}}{1} \cdot \frac{9}{\cancel{(x+2)}\cancel{(x+5)}}$

$3(x+2) = 5(x+5) - 9$

$3x+6 = 5x+25-9$

$6+9-25 = 5x-3x$

$-10 = 2x$

$-5 = x$

$\boxed{\text{no solution}}$

3. Multiply or divide and simplify. State the values which are not in the domain for each variable.

$$\frac{2x^2+8x+8}{x^2+9x+14} \div \frac{x^2-25}{x^2+2x-35}$$

$$= \frac{2(x^2+4x+4)}{x^2+9x+14} \cdot \frac{x^2+2x-35}{x^2-25}$$

$$= \frac{2(\cancel{x+2})(x+2)}{(\cancel{x+2})(\cancel{x+7})} \cdot \frac{(\cancel{x+7})(\cancel{x-5})}{(x+5)(\cancel{x-5})} = \boxed{\frac{2(x+2)}{x+5},\ x \neq -7, -5, -2, 5}$$

4. Subtract and simplify. State the values which are not in the domain for each variable.

$$\frac{2x-1}{x-4} - \frac{x^2-10x-7}{x^2+x-20}$$

$(x+5)(x-4)$

$$\frac{(2x-1)}{(x-4)} \cdot \frac{(x+5)}{(x+5)} - \frac{(x^2-10x-7)}{(x+5)(x-4)}$$

$$\frac{2x^2+10x-x-5-x^2+10x+7}{(x-4)(x+5)} = \boxed{\frac{x^2+19x+2}{(x-4)(x+5)},\ x \neq -5, 4}$$