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

20. Solve the equation for x.
$(x-1)^2 = 31 - x$

$(x-1)^2 + x - 31 = 0$
$(x-1)(x-1)$
$x^2 - 2x + 1 + x - 31 = 0$
$x^2 - x - 30 = 0$
$(x-6)(x+5) = 0$
$x = 6, x = -5$

If $ax^2+bx+c=0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
$a=1, b=-1, c=-30$
$\frac{-(-1) \pm \sqrt{(-1)^2-4(1)(-30)}}{2(1)}$
$\frac{1 \pm \sqrt{121}}{2} = \frac{1 \pm 11}{2}$
$\frac{1+11}{2} = 6$
$\frac{1-11}{2} = -5$

Find the equation of the line that passes through the points $(-4, 7)$ and $(-4, -3)$.

$x = -4$

Same x-coord ⇒ vertical line

5. Simplify and state the values which are not in the domain for each variable.

$$\frac{\frac{3}{x}-\frac{2}{x-2}}{\frac{2}{x}+\frac{5}{x-2}} = \frac{\frac{3}{x}\cdot\frac{(x-2)}{x-2}-\frac{2}{x-2}\cdot\frac{x}{x}}{\frac{2}{x}\cdot\frac{(x-2)}{x-2}+\frac{5}{x-2}\cdot\frac{x}{x}} = \frac{\left(\frac{3(x-2)-2x}{x(x-2)}\right)}{\left(\frac{2(x-2)+5x}{x(x-2)}\right)}$$

$$= \frac{(3x-6-2x)}{\cancel{x(x-2)}}\cdot\frac{\cancel{x(x-2)}}{(2x-4+5x)} = \frac{x-6}{7x-4}, \quad x\neq 0, 2, \frac{4}{7}$$

17. Simplify.

$\sqrt[2]{64x^6y^{16}}$

$\sqrt{(8)^2(x^3)^2(y^8)^2}$

$8|x^3|y^8$

18. Simplify.

$\sqrt[3]{64x^6y^{15}}$

$\sqrt[3]{(4)^3(x^2)^3(y^5)^3}$

$= 4x^2y^5$

$$\sqrt[n]{x^n} = \begin{cases} x, & n \text{ odd} \\ |x|, & n \text{ even} \end{cases}$$

21. Solve for x.

$$\frac{3}{x+5}+\frac{4}{(x+5)(x+3)}=\frac{2}{x+3}$$

$\frac{(x+5)(x+3)}{1}\left(\frac{3}{x+5}+\frac{4}{(x+5)(x+3)}\right)=\frac{(x+5)(x+3)}{1}\cdot\frac{2}{x+3}$

$(x+3)\cdot 3 + 4 = 2(x+5)$

$3x+9+4 = 2x+10$

$3x-2x = 10-9-4$

$x = -3$

no solution

10. Simplify.

$$\left(\frac{4}{25}\right)^{3/2}$$

$= \sqrt[2]{\left(\frac{4}{25}\right)^3} = \left(\sqrt[2]{\frac{4}{25}}\right)^3$ ✓

$X^{m/n} = \left(\sqrt[n]{X}\right)^m = \sqrt[n]{(X)^m}$

$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

$= \left(\frac{2}{5}\right)^3 = \frac{2^3}{5^3} = \frac{8}{125}$

16. Divide the polynomials. Give the quotient and the remainder.

$(4x^3 + 2x^2 - 5x - 3) \div (x + 2)$

$-2 \mid 4 \;\; 2 \;\; -5 \;\; -3$

$\quad\quad -8 \;\; 12 \;\; -14$

$4 \;\; -6 \;\; 7 \;\; \boxed{-17}$ ← R

Q: $4x^2 - 6x + 7$

$$x+2 \;\overline{)\; 4x^3+2x^2-5x-3}$$

$4x^2 - 6x + 7 + \frac{-17}{x+2}$

$-(4x^3 + 8x^2)$

$-6x^2 - 5x - 3$

$-(-6x^2 - 12x)$

$7x - 3$

$-(7x + 14)$

-17

17. Completely factor the polynomial.

$64x^3 - 27 = (4x)^3 - 3^3$

$= (4x-3)(16x^2 + 12x + 9)$

19. Divide. Write your answer as a single, simplified fraction, and state the values of the variable for which the expression is undefined.

$$\frac{(x+3)(x-4)}{(x+4)(x-5)} \div \frac{(x+3)(x-5)}{(x+4)(x-4)}$$

$$\frac{(x+3)(x-4)}{(x+4)(x-5)} \cdot \frac{(x+4)(x-4)}{(x+3)(x-5)}$$

$$= \frac{(x-4)^2}{(x-5)^2}$$

$x \neq -3, -4, 5, 4$

18. Completely factor the polynomial.

$6x^5 + 10x^4 - 24x^3$ $= 2x^3(3x^2+5x-12)$

$= 2x^3[3x^2+9x-4x-12]$

$= 2x^3[3x(x+3)-4(x+3)] = \boxed{2x^3(x+3)(3x-4)}$

19. Solve the system of equations. If it exists, give your solution as an ordered pair (x, y).

$\begin{matrix}(3x-3y=4)(2)\\(2x-4y=2)(-3)\end{matrix} \Rightarrow \begin{matrix}6x-6y=8\\-6x+12y=-6\end{matrix}$

$6y = 2$

$y = \frac{2}{6} = \frac{1}{3}$

$3x-3(\frac{1}{3}) = 4$

$3x-1 = 4$

$3x = 5$

$x = 5/3$

$\boxed{(\frac{5}{3}, \frac{1}{3})}$

$36x^2-64 = (6x)^2-8^2$

$= (6x-8)(6x+8)$

$= 2(3x-4)2(3x+4)$

$= 4(3x-4)(3x+4)$

$4(9x^2-16)$

6. Simplify.

$\sqrt[3]{54x^4}$

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

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

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

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

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

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

$= \sqrt{49+9} = \sqrt{58}$

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

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

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

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

$y = -2$

horizontal line

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

26. x-intercept: $6x+3(0)=12$ $6x=12$ $x=2$ $(2,0)$

27. y-intercept: $6(0)+3y=12$ $y=4$ $(0,4)$

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

$3y=-6x+12$

$y=-2x+4$