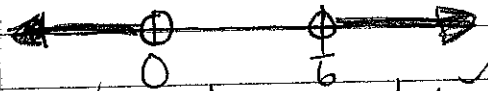
HW 3/5/15

p.220, #33-37, 38-46 evens, 58-62

33. $\frac{1}{3x} < 2 \quad x \neq 0$

$1 = 6x$

$x = \frac{1}{6}$



$\frac{1}{-3} < 2$ ✓ $\quad \frac{1}{3(\frac{1}{12})} < 2$ ✗ $\quad \frac{1}{3} < 2$ ✓

$4 < 2$

$(-\infty, 0) \cup (\frac{1}{6}, \infty)$

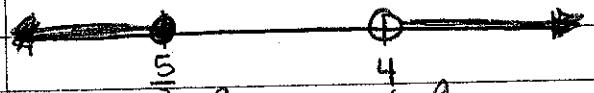
$-\infty < x < 0 \ \cup \ \frac{1}{6} < x < \infty$

34. $\frac{9}{x-4} \geq -6 \quad x \neq 4$

$9 \geq -6x + 24$

$-15 \geq -6x$

$x = \frac{5}{2}$



$\frac{9}{-4} \geq -6$ ✓ $\quad \frac{9}{3-4} \geq -6$ ✗ $\quad \frac{9}{5-4} \geq -6$ ✓

$-3 \geq -6$ $\quad -9 \geq -6$ $\quad 9 \geq -6$

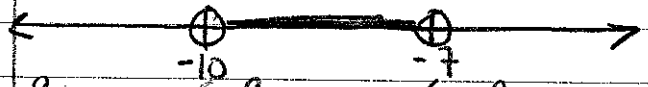
$(-\infty, \frac{5}{2}] \cup (4, \infty)$

35. $\frac{9}{x+10} > 3 \quad x \neq -10$

$9 = 3x + 30$

$-21 = 3x$

$x = -7$



$\frac{9}{-11+10} > 3$ | $\frac{9}{-9+10} > 3$ | $\frac{9}{0+10} > 3$

$-9 > 3x$ | $9 > 3$ ✓ | $\frac{9}{10} > 3$ ✗

$(-10, -7)$ or $-10 < x < -7$

36. $L \cdot W \leq 17000$

$L \leq \frac{17000}{W}$

$P \leq 2W + 2\left(\frac{17000}{W}\right)$

$P \leq 2W + \frac{34000}{W}$

$400 \leq 2W + \frac{34000}{W}$

$400W = 2W^2 + 34000$

$2W^2 - 400W + 34000 = 0$

$W^2 - 200W + 17000 = 0$

$W = \frac{200 \pm \sqrt{40000 - 68000}}{2}$

no, the answer is imaginary.

37. 2001: $\frac{191}{614} = .311$

2002: $\frac{191}{644} = .297$

2003: $\frac{156}{482} = .324$

2004: $\frac{188}{643} = .292$

2003 was the strongest year

b. $\frac{191}{614} = \frac{188+h}{643+h}$

$191(643+h) = 614(188+h)$

$122813 + 191h = 115432 + 614h$

$7381 = 423h$

$h = 17.45$

Jeter would have needed 18 more consecutive hits

38. $\frac{15h}{h-3} = \frac{5}{h-3} - 8$

$15h = 5 - 8h + 24$

$23h = 29$

$h = \frac{29}{23}$

40. $\frac{4}{x} + 6 = \frac{1}{x^2}$

$4x + 6x^2 = 1$

$6x^2 + 4x - 1 = 0$

$x = \frac{-4 \pm \sqrt{40}}{12} = \frac{-4 \pm 2\sqrt{10}}{12} = \frac{-2 \pm \sqrt{10}}{6}$

42. $\frac{2(x+4)}{x-4} = \frac{3x}{x-4}$

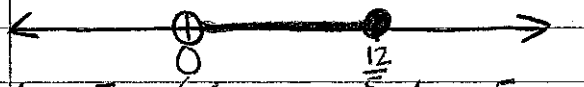
$2x+8 = 3x$

$\boxed{x = 8}$

44. $\frac{6}{r} \geq \frac{5}{2}$

$12 = 5r$

$r = \frac{12}{5}$



$\frac{6}{-1} \geq \frac{5}{2}$ | $\frac{6}{1} \geq \frac{5}{2}$ | $\frac{6}{3} \geq \frac{5}{2}$

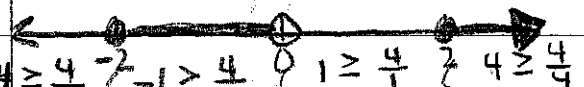
x | $-6 \geq \frac{5}{2}$ | $6 \geq \frac{5}{2}$ | $2 \geq \frac{5}{2}$ | x

$\boxed{(0, \frac{12}{5}] \text{ or } 0 < x \leq \frac{12}{5}}$

46. $x \geq \frac{4}{x}$

$x^2 = 4$

$x = \pm 2$



$-\frac{4}{4} \geq \frac{4}{-4}$ | $-\frac{4}{-1} \geq \frac{4}{-1}$ | $\frac{4}{1} \geq \frac{4}{1}$ | $\frac{4}{4} \geq \frac{4}{4}$

$-4 \geq -1$ | $-1 \geq 4$ | $1 \geq 4$ | $4 \geq 1$ ✓

x | | x |

$\boxed{[-2, 0) \cup [2, \infty)}$

$\boxed{-2 \leq x < 0 \cup 2 \leq x < \infty}$

$\frac{3x}{x-4}$

58. $\frac{4x}{x^2+x-6} = \frac{7x}{x^2-5x-24}$ $x \neq -3, 2, 8$

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

$4x(x-8) = 7x(x-2)$

$4x^2 - 32x = 7x^2 - 14x$

$3x^2 + 18x = 0$

$3x(x+6) = 0$

$\boxed{x = 0, -6}$

59. $\frac{1 - \frac{4}{x} + \frac{3}{x^2} \cdot x^2}{1 - \frac{9}{x^2}} \cdot \frac{x-1}{x+3}$ $x \neq 0, -3$

$\frac{x^2-4x+3}{x^2-9} = \frac{x-1}{x+3}$

$(x-3)(x+3)$

$x^2 - 4x + 3 = (x-1)(x-3)$

$x^2 - 4x + 3 = x^2 - 4x + 3$

$\boxed{x = \mathbb{R} \text{ except } 0, -3, 3}$

60. $\frac{3x}{x+2} - \frac{2}{x+4} \geq 7$ $x \neq -2, -4$

$3x(x+4) - 2(x+2) = 7(x+2)(x+4)$

$3x^2 + 12x - 2x - 4 = 7x^2 + 42x + 56$

$4x^2 + 32x + 60 = 0$

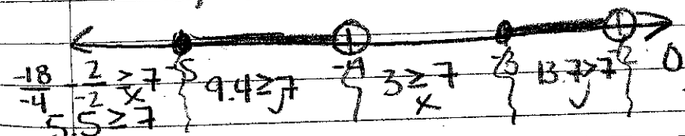
$4(x^2 + 8x + 15) = 0$

$4(x+3)(x+5) = 0$

$x = -3, -5$

$\boxed{[-5, -4) \cup [-3, -2)}$

$\boxed{-5 \leq x < -4 \cup -3 \leq x < -2}$



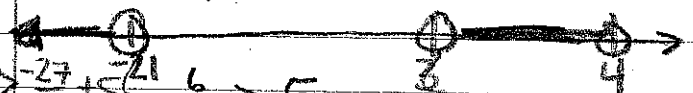
61. $\frac{6}{x-3} > \frac{x}{4} + 5 \quad x \neq 3$

$24 = x^2 - 3x + 20x - 60$

$0 = x^2 + 17x - 84$

$0 = (x+21)(x-4)$

$x = -21, 4$



$\frac{6}{-27-3} > \frac{-27}{4} + 5$ | $\frac{6}{-3} > 5$ | $12 > 5.875$ ✓ | $\frac{6}{5-3} > \frac{5}{4} + 5$

$-\frac{1}{5} > \frac{7}{4}$ ✗ | $-2 > 5$ ✗ | | $3 > 6.25$ ✗

$(-\infty, -21) \cup (3, 4)$

$-\infty < x < -21 \cup 3 < x < 4$

62. $\left(\frac{1}{x}\right) \cdot 6 + \left(\frac{2}{x}\right) \cdot 6 = \frac{1}{3}$ x = time for Will to work by himself

$3x\left(\frac{6+12}{x} = \frac{1}{3}\right)$

$54 = x$ | 54 hours for whole barn for Will

27 hours for Marcus

$\frac{2}{3}(27) = 18$ additional hours