Rev. – Variations – Rationals – Radicals

1) $y = k \times z$

$24 = k(2)(-4)$

$k = \frac{24}{(2)(-4)} = -3$

$y = -3 \times z$

$y = -3(-3)(-6) = -54$

2) $z = \frac{k \times y}{w}$

$6 = \frac{k(12)(-2)}{5}$

$k = \frac{30}{-24} = \frac{-5}{4}$

$z = \frac{-5 \times y}{4w}$

$z = -\frac{5}{4}\frac{(7)}{(8)}\frac{(1)}{(14)}2$

$z = -\frac{1}{8}$

3) $min = \frac{k(Prob)}{(people)}$

$36min = \frac{k(18)}{(4)}$

$k = \frac{(36)(4)}{(18)}$

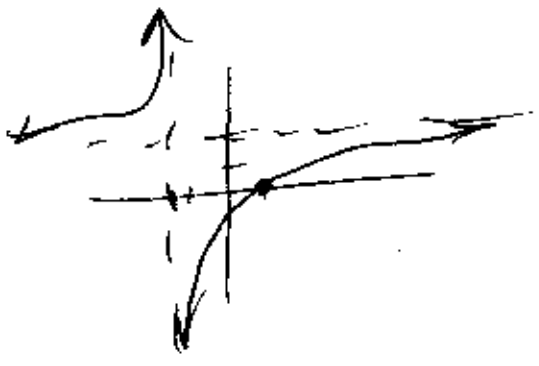
$k = 8$

$min = \frac{8(Prob)}{people}$

$min = \frac{8(42)}{6} = 56 \text{ min}$

4) $\frac{2(x-1)}{x+2}$ → x-int @ 1

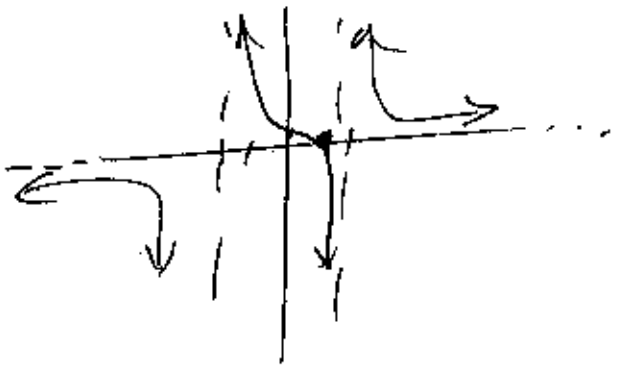
→ Vert. asy @ −2



5) $\frac{2(x-1)}{2(x+2)(x-2)}$

x-int. @ 1

v. asy @ 2, -2



$f(0) = \frac{1}{4}$

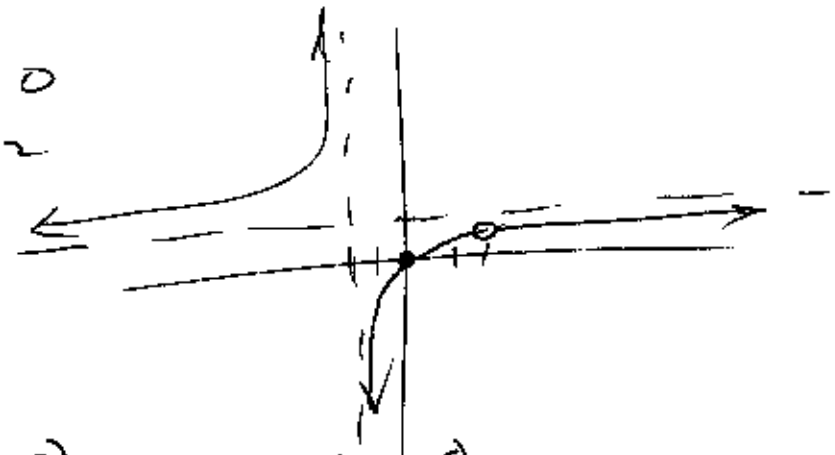
$f(3) = \frac{7}{5}$

$f(-3) = \frac{-4}{5}$

6) $\frac{x(x-2)}{(x+2)(x-2)}$ hole @ $(2, \frac{1}{2})$

x-int @ 0

v. asy @ -2



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

$3x+6 + 5x-10 = 4x^2$

$4x^2 - 8x + 4 = 0$

$4(x^2 - 2x + 1) = 0$

$4(x-1)(x-1) = 0$

$x = 1$

8) $\frac{4}{(x-6)(x-2)} = \frac{x}{(x-2)} + \frac{1}{(x-6)}$

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

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6, -1$

x can't $= 6$

so $x = -1$

9) $\frac{(x+1)(x-6)}{x-2} = \frac{(x+1)(x-6)}{x-3} - \frac{(2x-7)(x+1)}{(x-6)}$

$(x-2)(x-6) = (x-3) - (2x-7)(x+1)$

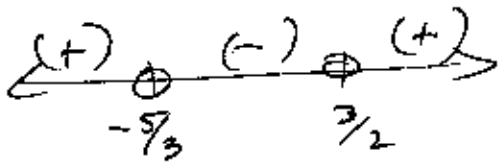
$x^2 - 8x + 12 = x - 3 - (2x^2 - 5x - 7)$

$x^2 - 8x + 12 + 2x^2 - 5x - 7 - x + 3 = 0$

$3x^2 - 14x + 8 = 0$

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

$x = \frac{2}{3}, 4$

10) 

$f(x) > 0$ @

$x < -5/3$ or $x > 3/2$

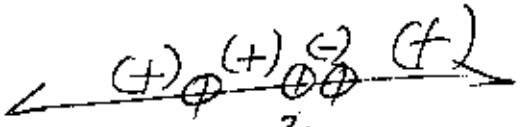
11) $\frac{x}{x+1} + \frac{2x}{x-1} - \frac{2}{(x+1)(x-1)} > 0$

$\frac{x(x-1) + 2x(x+1) - 2}{(x+1)(x-1)} > 0$

$\frac{x^2 - x + 2x^2 + 2x - 2}{(x+1)(x-1)} > 0$

$\frac{3x^2 + x - 2}{(x+1)(x-1)} > 0$

$\frac{(3x - 2)(x + 1)}{(x+1)(x-1)} > 0$

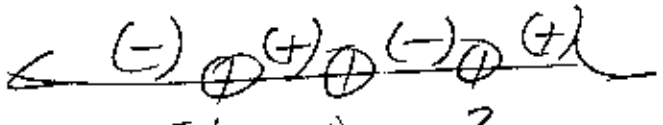


$x > 1$ or $x < 2/3$ But $x \neq -1$

12) $x - 1 - \frac{2}{x} \leq 0$

$$\frac{x^2 - x - 2}{x} \leq 0$$

$$\frac{(x-2)(x+1)}{x} \leq 0$$



$x \leq -1$ or $0 < x \leq 2$

13) $\frac{(x+3)(x-3)}{(x-2)(x-2)} \cdot \frac{(x+2)(x-2)}{(x-3)(x+2)}$

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

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

$\frac{1}{(x-7)^2}$

15) $\frac{(x+1)(x+3)}{(x+2)(x+4)} \cdot \frac{(x+5)(x+2)}{(x+3)(x+6)} \cdot \frac{x(x+6)}{(x+7)(x+5)}$

$$\frac{x(x+1)}{(x+4)(x+7)}$$

16) $\frac{3}{5x-3} \cdot \frac{5x-3}{6x} + \frac{7}{x}$

$2x$

$$\frac{1}{2x} + \frac{14}{2x} = \frac{15}{2x}$$

17) $\left(\frac{x+1}{x-9}\right)\left(\frac{2}{x+9}\right) - \frac{4x}{(x+9)(x-9)}$

$$\frac{2x+2-4x}{(x+9)(x-9)} = \frac{-2x+2}{(x+9)(x-9)}$$

18) $\frac{2x-1}{x+8} + \frac{x}{x-2} - \frac{(5x+4)}{(x+8)(x-2)}$

$$\frac{(x-2)(2x-1) + x(x+8) - (5x+4)}{(x+8)(x-2)}$$

$$\frac{2x^2-5x+2+x^2+8x-5x-4}{(x+8)(x-2)}$$

$$\frac{3x^2-2x-2}{(x+8)(x-2)}$$

19) $\frac{3}{5}(-3) = \frac{-9}{5}$

20) $(3+13)^{\frac{1}{2}} = \sqrt{16} = 4$

21) $\frac{3}{3}(\frac{3}{8}) + \frac{1}{4}$

$\frac{7}{4} + \frac{1}{4} = \frac{8}{4} = 2$

22) $2x + 8 \geq 0$

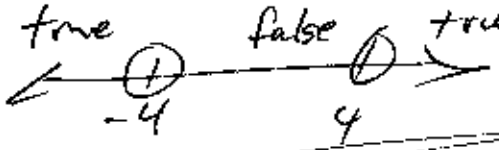
$2x \geq -8$

$x \geq -4$

23) $x - 3 \geq 0$

$x \geq 3$

24) $x^2 - 16 = (x+4)(x-4) \geq 0$



$x \leq -4$ or $x \geq 4$

25) $x = y_1^2 + 1$

$x - 1 = y_1^2$

$y_1 = \pm\sqrt{x-1}$

26) $x = y^2 + 6y$

complete the square

$x + 9 = (y+3)^2$

$y + 3 = \pm\sqrt{x+9}$

$y = -3 \pm \sqrt{x+9}$

27) $y = (x-4)^2 \sim x = (y-4)^2$

$y - 4 = \pm\sqrt{x}$

$y = 4 \pm \sqrt{x}$

28) $\sqrt[3]{27x^3} = 3x$

29) $\sqrt[4]{\frac{81y^5}{x^4y}} = \sqrt[4]{\frac{81\ y^4}{x^4}} = \frac{3y}{x}$

30) $\sqrt[3]{\frac{48x^2y^4z^4}{6x}} = \sqrt[3]{8xy^4z^9} = 2yz\sqrt[3]{xyz}$

31) $2 - 3\sqrt{5} - 3 - 4\sqrt{5}$

$-1 - 7\sqrt{5}$

32) $-\sqrt{5} + 3(5) + 8 - 24\sqrt{5}$

$-25\sqrt{5} + 27$

33) $2\sqrt{3} - 3\sqrt{2} + 8\sqrt{2}$

$2\sqrt{3} + 5\sqrt{2}$

34) $\frac{4}{\sqrt{6}}\left(\frac{\sqrt{6}}{\sqrt{6}}\right) = \frac{4\sqrt{6}}{6} = \frac{2\sqrt{6}}{3}$

35) $\frac{14}{\sqrt{5}+\sqrt{3}}\cdot\frac{(\sqrt{5}-\sqrt{3})}{(\sqrt{5}-\sqrt{3})} = \frac{14\sqrt{5}-14\sqrt{3}}{5-3}$

$7\sqrt{5} - 7\sqrt{3}$

36) $\frac{3}{2+\sqrt{3}}\left(\frac{2-\sqrt{3}}{2-\sqrt{3}}\right) = \frac{6-3\sqrt{3}}{4-3} = 6-3\sqrt{3}$

37) $x - 3 = 4$

$x = 7$

$x - 3 \geq 0$

$x \geq 3$

38) $x \neq -2, \quad x \geq 0$

$x + 2 = 16x$

$2 = 15x$

$\frac{2}{15} = x$

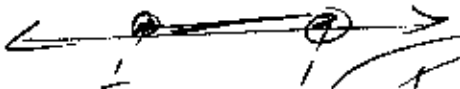
39) $x - 2 = 2x + 1$

$-3 = x$

40) $2x - 1 \geq 0$ $\qquad$ $2x - 1 \leq 1$

$2x \geq 1$ $\qquad$ $2x \leq 2$

$x \geq 1/2$ $\qquad$ $x \leq 1$



$\frac{1}{2} \leq x \leq 1$

41) $3x + 4 \geq 0$ $\qquad$ $3x + 4 \geq 4$

$3x \geq -4$ $\qquad$ $3x \geq 0$

$x \geq -4/3$ $\qquad$ $x \geq 0$

42) $(x-2)(x-2) \leq 0$

$\sqrt{\ }$ with never be less than zero

No Solution