Solutions – Theta (Ratio/Prop)

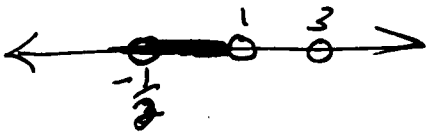
(1) $\frac{-27 \le x \le -10}{-29 \le x \le 5} \Rightarrow \frac{17}{34} = \frac{1}{2}$

(2) $\frac{(x-3)(x+1)}{(2x+1)(x-3)} > \frac{2}{3}$ $\quad x \neq 3$, $x \neq -\frac{1}{2}$

$3x+3 > 4x+2$

$-1x > -1$

$x < 1$



$-\frac{1}{2} < x < 1$

(3)

	1	2	3	4	5
	6	10	14	18	22

(+1 +1 +1 +1; +4 +4 +4 +4)

rate $= 4/1 = 4$.

(4) $\frac{400 \text{ mi}}{16 \text{ gal}} = \frac{x \text{ mi}}{4.5}$

$16x = 1800$

$x = 112.5$

(5) $\frac{4 \cdot 3 \cdot 16}{6 \cdot 6 \cdot 8} = \frac{192}{288} = \frac{2}{3}$

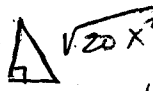
(6) $(-3n, 3)(5n, 5n+4)$

$\frac{5n+4-3}{5n-3n} = \frac{2}{3}$

$\frac{5n+1}{8n} = \frac{2}{3}$ $\quad 15n+3 = 16n$

$3 = n$

(7)



$\sqrt{20x^2} = (16)$

$20x^2 = 256$

$x^2 = \frac{256}{20} = \frac{64}{5}$

$x = \frac{8}{\sqrt{5}}$

short leg $= 2x =$ $\frac{16}{\sqrt{5}}$ or $\frac{16\sqrt{5}}{5}$

(8)

	6	14	b
	15	35	50

(+8 +21; +20 +15)

$\frac{5}{2} \frac{20}{8} = \frac{15}{b-14}$

$56 - 70 = 30$

$56 = 100$

$b = 20$

(9)

	5	9	b
	14	22	44

(+8; +4)

$y = 2x + b$

$14 = 2(5) + b$

$4 = b$

$y = 2x + 4$

$44 = 2x + 4$

$40 = 2x$

$20 = x$

(10) $x = -4$, $y = 20$ $\quad 20 = -4 \cdot m$

$m = -5$

$y = -5x$

$x = 5$, $y = ?$ $\quad y = -25$

(11) $\frac{6}{3a+6} = \frac{2}{a+2}$ $\quad a \neq -2$

$6a + 12 = 6a + 12$

all Real # except -2

(12) $\frac{2^{\frac{3}{-1}} 5^{\frac{4}{5}} 9^{\frac{7}{13}} 16}{\quad 27}$

note because $xy \neq k$

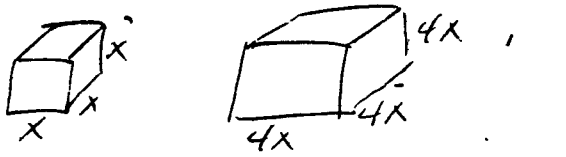
$\frac{6}{3}$ $\frac{8}{4}$ $\frac{14}{7}$ all $= 2$.

$y = 2x + b$ $\quad y = 2x - 5$

$-1 = 2(2) + b$

$-5 = b$

linearly related.

(13) 

Surface area $\frac{6x^2}{6(16x^2)} = \frac{1}{16}$

(14) $\frac{x-2}{4} = \frac{16}{x-2}$ $\quad x \neq 2$

$x^2 - 4x + 4 = 64$

$x^2 - 4x - 60 = 0$

$(x-10)(x+6)$

$x = 10, x = -6$

(15) 14 games * 8 average $= 112$ shot

$112 - 57 = 55$

(16) $y = mx$

$12 = m \cdot 3$

$4 = m$

$y = 4x$ $\quad y + 2x = 24$

$4x + 2x = 24$

$6x = 24$

$x = 4, y = 16$

(17) $\frac{12+x}{150+x} \geq \frac{20}{100} \frac{1}{5}$

$60 + 5x \geq 150 + x$

$4x \geq 90$

$x \geq 22.5$

(18) $xy = 16$

x	2	4	-1	-8
y	8	4	-16	-2

(19) $xy = K$ $\quad x \cdot -8 = 35$

$2.5 * 14 = 35$ $\quad x = -4.375$

$xy = 35$

(20) $\left(\frac{1}{20} \cdot t + \frac{1}{15} \cdot t = 1\right) 60$

$3t + 4t = 60$

$7t = 60$

$t = 8\frac{4}{7}$.

(21) $450 * .05 = 22.5$ salt

$\frac{22.5}{200} \Rightarrow 11.25\%$

(22) $\frac{16+x}{16+13+x} > \frac{16}{10} \frac{3}{5}$

$80 + 5x > 87 + 3x$

$2x > 7$

$x > 3.5$

(23) $Ax - A + Bx + 2B = 7x + 2$ $x \neq -2$, $x \neq 1$

$Ax + Bx = 7x$ $\quad A + B = 7$

$-A + 2B = 2$ $\quad -A + 2B = 2$

$3B = 9$

$B = 3$

$A = 4$

(24) $\frac{13 + x}{35 + x} = \frac{2}{3}$

$39 + 3x = 70 + 2x$

$x = 31$

$13 + 31 \Rightarrow 44$

$35 + 31 \Rightarrow 66$

(25) $\frac{50 + 13}{58 + x} > \frac{9}{10}$ $\quad +13$

$\frac{63}{71 + x} > \frac{9}{10}$

$630 > 639 + 9x$

$-9 > 9x$

$x < -1$

not possible

(26) $\frac{1}{m} \cdot 2 + \frac{1}{m+3} \cdot 2 = 1$ $\quad m \neq 0, -3$

$\frac{2}{m} \cdot \frac{m+3}{} + \frac{2}{m+3} \cdot \frac{m}{} = 1 \quad (m)(m+3)$

$2m + 6 + 2m = m^2 + 3m$

$0 = m^2 - 1m - 6$

$(m - 3)(m + 2)$

$3 + 3 = 6$

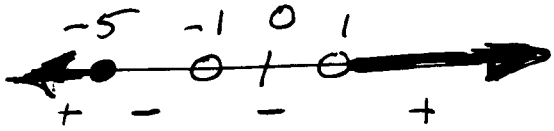
$m = 3$

~~$m = -2$~~

(27) $\frac{x^2 + 6x + 5}{x^2 - 1} \geq 0$

$\frac{(x+5)(x+1)}{(x+1)(x-1)} \geq 0$

$x \neq \pm 1$



$x \leq -5$ or $x > 1$

(28) $\frac{10^{9.1} \cdot 10^{0}}{10^{8.25} \cdot 10^{0}} \Rightarrow 10^{.85}$

7.1

(29)

	Anti	Water
Start	$.70(16) = 11.2$	$.30(16) = 4.8$
drain	$.7x$	$.3x$
add water		x
result	$.55(16) = 8.8$	$.45(16) = 7.$

$11.2 - .7x = 8.8$

$-.7x = -2.4$

$x \approx 3.43$

$4.8 - .3x + x = 7.$

$.7x = 2.4$

$x \approx 3.43$