

Question #1

a.) $8x - y, x = 3, y = 4$

$$\begin{aligned} &8(3) - 4 \\ &24 - 4 \\ &\boxed{20} \end{aligned}$$

b.) $x^2 - 7x + 4, x = 8$

$$\begin{aligned} &(8)^2 - 7(8) + 4 \\ &64 - 56 + 4 \\ &8 + 4 \\ &\boxed{12} \end{aligned}$$

c.) $x^2 - 4(x - y)^2, x = 8, y = 3$

$$\begin{aligned} &(8)^2 - 4(8 - 3)^2 \\ &64 - 4(5)^2 \\ &64 - 4(25) \\ &64 - 100 \\ &\boxed{-36} \end{aligned}$$

Question #2

a.) $8(-3) - 5(-6)$

$$\begin{aligned} &-24 - (-30) \\ &-24 + 30 \\ &\boxed{6} \end{aligned}$$

b.) $5(-3)^2 - 2(-2)^2$

$$\begin{aligned} &5(9) - 2(4) \\ &45 - 8 \\ &\boxed{37} \end{aligned}$$

c.) $8^2 - 16 \div 2^2 \cdot 4 - 3$

$$\begin{aligned} &64 - 16 \div 4 \cdot 4 - 3 \\ &64 - 4 \cdot 4 - 3 \\ &64 - 16 - 3 \\ &48 - 3 \\ &\boxed{45} \end{aligned}$$

d.) $8 - 3[-2(5 - 7) - 5(4 - 2)]$

$$\begin{aligned} &8 - 3[-2(-2) - 5(2)] \\ &8 - 3[4 - 10] \\ &8 - 3(-6) \\ &8 - (-18) \\ &8 + 18 \\ &\boxed{26} \end{aligned}$$

e.) $15 - \sqrt{3 - (-1)} + 12 \div 2 \cdot 3 - |5 - (-2)|$

$$\begin{aligned} &15 - \sqrt{4} + 12 \div 2 \cdot 3 - |7| \\ &15 - 2 + 12 \div 2 \cdot 3 - 7 \\ &15 - 2 + 6 \cdot 3 - 7 \\ &15 - 2 + 18 - 7 \\ &13 + 18 - 7 \\ &31 - 7 \\ &\boxed{24} \end{aligned}$$

Question #3

a.) $6x + 10x^2 + 4x + 2x^2$

$$\boxed{12x^2 + 10x}$$

b.) $8(3x - 5) - 6x$

$$\begin{aligned} &24x - 40 - 6x \\ &\boxed{18x - 40} \end{aligned}$$

c.) $4(5y - 3) - (6y + 3)$

$$\begin{aligned} &20y - 12 - 6y - 3 \\ &\boxed{14y - 15} \end{aligned}$$

d.) $6 - 5[8 - (2y - 4)]$

$$\begin{aligned} &6 - 5[8 - 2y + 4] \\ &6 - 5[-2y + 12] \\ &6 - 5[-2y + 12] \\ &6 + 10y - 60 \\ &\boxed{10y - 54} \end{aligned}$$

e.) $14x^2 + 5 - [7(x^2 - 2) + 4]$

$$\begin{aligned} &14x^2 + 5 - [7x^2 - 14 + 4] \\ &14x^2 + 5 - (7x^2 - 10) \\ &14x^2 + 5 - 7x^2 + 10 \\ &\boxed{7x^2 + 15} \end{aligned}$$

Question #4

a.) $3x + 8 = 50$

$$\begin{aligned} &3x = 50 - 8 \\ &3x = 42 \\ &\boxed{x = 14} \end{aligned}$$

b.) $25 - 6x = -83$

$$\begin{aligned} &-6x = -83 - 25 \\ &-6x = -108 \\ &\boxed{x = 18} \end{aligned}$$

c.) $5x - 2 = 9x + 2$

$$\begin{aligned} &-2 = 9x + 2 - 5x \\ &-2 = 4x + 2 \\ &-2 - 2 = 4x \\ &-4 = 4x \\ &\boxed{-1 = x} \end{aligned}$$

d.) $3(x - 2) + 7 = 2(x + 5)$

$$\begin{aligned} &3x - 6 + 7 = 2x + 10 \\ &3x + 1 = 2x + 10 \\ &3x + 1 - 2x = 10 \\ &x + 1 = 10 \\ &x = 10 - 1 \\ &\boxed{x = 9} \end{aligned}$$

Question #4 continued

e.) $3(x-4) - 4(x-3) = x+3 - (x-2)$
 $3x-12-4x+12 = x+3-x+2$
 $-x = 5$
 $x = -5$

f.) $7(x+1) = 4[x - (3-x)]$
 $7x+7 = 4(x-3+x)$
 $7x+7 = 4(2x-3)$
 $7x+7 = 8x-12$
 $7 = 8x-12-7x$
 $7 = x-12$
 $7+12 = x$
 $19 = x$

g.) $\frac{x}{5} = \frac{x}{6} + 1$ LCD=30
 $30(\frac{x}{5}) = 30(\frac{x}{6}) + 30(1)$
 $6x = 5x + 30$
 $6x - 5x = 30$
 $x = 30$

h.) $2x - \frac{2x}{7} = \frac{x}{2} + \frac{17}{2}$ LCD=14
 $14(2x) - 14(\frac{2x}{7}) = 14(\frac{x}{2}) + 14(\frac{17}{2})$
 $28x - 4x = 7x + 119$
 $24x = 7x + 119$
 $24x - 7x = 119$
 $17x = 119$
 $x = 7$

i.) $\frac{x+1}{4} = \frac{1}{6} + \frac{2-x}{3}$ LCD=12
 $12(\frac{x+1}{4}) = 12(\frac{1}{6}) + 12(\frac{2-x}{3})$
 $3(x+1) = 2 + 4(2-x)$
 $3x+3 = 2+8-4x$
 $3x+3 = 10-4x$
 $3x+3+4x = 10$
 $7x+3 = 10$
 $7x = 10-3$
 $7x = 7$
 $x = 1$

j.) $\frac{3x}{5} - \frac{x-3}{2} = \frac{x+2}{3}$ LCD=30
 $30(\frac{3x}{5}) - 30(\frac{x-3}{2}) = 30(\frac{x+2}{3})$
 $18x - 15(x-3) = 10(x+2)$
 $18x - 15x + 45 = 10x + 20$
 $3x + 45 = 10x + 20$
 $45 = 10x + 20 - 3x$
 $45 = 7x + 20$
 $45 - 20 = 7x$
 $25 = 7x$
 $x = \frac{25}{7}$

Question #5

a.) $3x^5 \cdot 4x^6$
 $12x^{11}$

b.) $(4x^5y^6)(20x^7y^3)$
 $80x^{12}y^9$

c.) $\frac{-55a^5b^3c^8}{5a^3b^7c^2}$
 $\frac{-11a^2c^6}{b^4}$

d.) $\frac{30x^2y^{13}}{-6x^5y^{-2}}$
 $\frac{30x^2y^{13}y^2}{-6x^5}$

$\frac{-5y^{15}}{x^3}$

e.) $(\frac{-15a^4b^2}{5a^{10}b^{-3}})^3$
 $(\frac{-15a^4b^2b^3}{5a^{10}})^3$
 $(\frac{-3b^5}{a^6})^3$
 $\frac{(-3)^3(b^5)^3}{(a^6)^3}$
 $\frac{-27b^{15}}{a^{18}}$

f.) $(\frac{4a^{-5}b^3}{12a^3b^{-5}})^{-3}$
 $(\frac{4b^3b^5}{12a^3a^5})^{-3}$
 $(\frac{b^8}{3a^8})^{-3}$
 $\frac{(b^8)^{-3}}{(3)^{-3}(a^8)^{-3}}$
 $\frac{b^{-24}}{3^{-3}a^{-24}}$
 $\frac{3^3a^{24}}{b^{24}} = \frac{27a^{24}}{b^{24}}$

Question #6

a.) $\frac{A}{l} = \frac{lw}{l}$ for w

$$w = \frac{A}{l}$$

b.) $T = D + pm$ for p

$$\frac{T-D}{m} = \frac{pm}{m}$$

$$p = \frac{T-D}{m}$$

c.) $\frac{y - y_1}{x - x_1} = \frac{m(x - x_1)}{x - x_1}$ for m

$$m = \frac{y - y_1}{x - x_1}$$

d.) $s = \frac{1}{2}at^2 + vt$ for v

$$2(s) = 2\left(\frac{1}{2}at^2\right) + 2vt$$

$$2s = at^2 + 2vt$$

$$\frac{2s - at^2}{2t} = \frac{2vt}{2t}$$

$$v = \frac{2s - at^2}{2t}$$

Question #7

number = n

$$2n - 3 = 11$$

$$2n = 11 + 3$$

$$2n = 14$$

$$n = 7$$

The number is 7.

Question #8

number = n

$$n - 0.3n = 28$$

$$\frac{0.7n}{0.7} = \frac{28}{0.7}$$

$$n = 40$$

The number is 40.

Question #9

number = n

$$\frac{0.7n}{0.7} = \frac{252}{0.7}$$

$$n = 360$$

The number is 360.

Question #10

1st number = x

2nd number = y

$$x = y + 24 \rightarrow x + y = 58$$

$$4 + 24 + y = 58$$

$$2y + 24 = 58$$

$$2y = 58 - 24$$

$$2y = 34$$

$$y = 17$$

$$x = 17 + 24 = 41$$

The numbers are 41 and 17.

Question #11

first angle = f

second angle = s

third angle = t

$$f + s + t = 180$$

$$f = 2s$$

$$t = s - 20$$

$$2s + s + s - 20 = 180$$

$$4s - 20 = 180$$

$$4s = 180 + 20$$

$$4s = 200$$

$$s = 50$$

$$f = 2(50) = 100$$

$$t = 50 - 20 = 30$$

The angles are $100^\circ, 50^\circ, 30^\circ$

Question #12

purchase amount = p .

$$A = 300 + 0.7p \quad B = 40 + 0.9p$$

$$300 + 0.7p = 40 + 0.9p$$

$$300 = 40 + 0.9p - 0.7p$$

$$300 = 40 + 0.2p$$

$$300 - 40 = 0.2p$$

$$\frac{260}{0.2} = \frac{0.2p}{0.2}$$

$$1300 = p$$

$$p = 1300$$

\$1300 in merchandise must be purchased.

$$300 + 0.7(1300) = 1210$$

\$1210 will be the cost

Question #13

dealer's cost = c

$c + 0.25c = 15$

$1.25c = 15$

$c = 12$

The dealer's cost is \$12.

Question #14

length = l

width = w

$l = 2w$ $P = 2l + 2w$

$300 = 2l + 2w$

$300 = 2(2w) + 2w$

$300 = 4w + 2w$

$300 = 6w$

$w = 50$

$l = 2(50) = 100$

The length is 100 yards and the width is 50 yards.

Question #15

length = l

width = w

$l = 2w - 6$ $P = 2l + 2w$

$126 = 2l + 2w$

$126 = 2(2w - 6) + 2w$

$126 = 4w - 12 + 2w$

$126 = 6w - 12$

$126 + 12 = 6w$

$138 = 6w$

$w = 23$ $l = 2(23) - 6 = 40$

The length is 40 m and the width is 23 m.

Question #16

a.) $y = \frac{2}{3}x - \frac{3}{4}$

slope = $\frac{2}{3}$

y-intercept $(0, -3/4)$

x-intercept:

$0 = \frac{2}{3}x - \frac{3}{4}$

$12(0) = 12(\frac{2}{3}x) - 12(\frac{3}{4})$

$0 = 8x - 9$

$9 = 8x$

$x = 9/8$ $(9/8, 0)$

b.) $5x - 4y = 20$

x-intercept:

$5x - 4(0) = 20$

$5x = 20$

$x = 4$ $(4, 0)$

y-intercept

$5(0) - 4y = 20$

$-4y = 20$

$y = -5$

$(0, -5)$

slope:

$5x - 4y = 20$

$\frac{-4y}{-4} = \frac{-5x + 20}{-4}$

$y = \frac{5}{4}x - 5$

$m = 5/4$

Question #17

a.) Parallel to $x + 2y = 6$ through $(3, 7)$

$\frac{dy}{dx} = \frac{-x + 6}{2}$

$y = -\frac{1}{2}x + 3$

$m = -1/2, (3, 7)$

$y - 7 = -\frac{1}{2}(x - 3)$

$y - 7 = -\frac{1}{2}x + \frac{3}{2}$

$y = -\frac{1}{2}x + \frac{3}{2} + 7$

$y = -\frac{1}{2}x + \frac{17}{2}$

b.) Perpendicular to $3x + 4y = 5$ through $(3, -2)$

$3x + 4y = 5$

$\frac{4y}{4} = \frac{-3x + 5}{4}$

$y = -\frac{3}{4}x + \frac{5}{4}$

$m = \frac{4}{3} (3, -2)$

$y - (-2) = \frac{4}{3}(x - 3)$

$y + 2 = \frac{4}{3}x - 4$

$y = \frac{4}{3}x - 6$

Question #17 continued

c.) Through $(3, 4)$ and $(6, 2)$

$$m = \frac{2-4}{6-3} = -\frac{2}{3}$$

$$y-4 = -\frac{2}{3}(x-3)$$

$$y-4 = -\frac{2}{3}x + 2$$

$$y = -\frac{2}{3}x + 6$$

$$\boxed{y = -\frac{2}{3}x + 6}$$

d.) $m = \frac{2}{3}$ $(1, 5)$

$$y-5 = \frac{2}{3}(x-1)$$

$$y-5 = \frac{2}{3}x - \frac{2}{3}$$

$$y = \frac{2}{3}x - \frac{2}{3} + 5$$

$$\boxed{y = \frac{2}{3}x + \frac{13}{3}}$$

e.) vertical line through $(3, 2)$

$$\boxed{x = 3}$$

f.) horizontal line through $(-2, 5)$

$$\boxed{y = 5}$$

Question #18

a.) $f(2) = 4(2) - 2 = 8 - 2 = \boxed{6}$

b.) $g(1) = 3(1)^2 - 5(1) + 6 = 3 - 5 + 6 = \boxed{4}$

c.) $(f+g)(x) = f(x) + g(x) = (4x-2) + (3x^2-5x+6) = \boxed{3x^2 - x + 4}$

d.) $(f-h)(2) = f(2) - h(2) = 6 - (-3) = \boxed{9}$

e.) $\left(\frac{f}{h}\right)(1) = \frac{f(1)}{h(1)} = \frac{2}{-5}$

$f(1) = 4(1) - 2 = 2$

$h(1) = 2(1) - 7 = -5$

f.) $f(x-3) = 4(x-3) - 2 = 4x - 12 - 2 = \boxed{4x - 14}$

g.) $(f \cdot g)(-3) = f(-3) \cdot g(-3) = -14 \cdot 48 = \boxed{-672}$

$f(-3) = 4(-3) - 2 = -14$

$g(-3) = 3(-3)^2 - 5(-3) + 6 = 48$

h.) $(f-g)(x) = f(x) - g(x) = (4x-2) - (3x^2-5x+6) = (4x-2) + (-3x^2+5x-6) = \boxed{-3x^2 + 9x - 8}$

Question #15

a.) Domain f : $\{x \mid x \neq 4\}$

$$x-4=0$$

$$x=4$$

b.) Domain g : $\{x \mid x \neq -3\}$

$$x+3=0$$

$$x=-3$$

c.) Domain $(f+g)$: $\{x \mid x \neq 4, -3\}$

d.) Domain $(f-g)$: $\{x \mid x \neq 4, -3\}$

Question #20

a.) $x-2y=16$

$y+3=3x$

By graphing

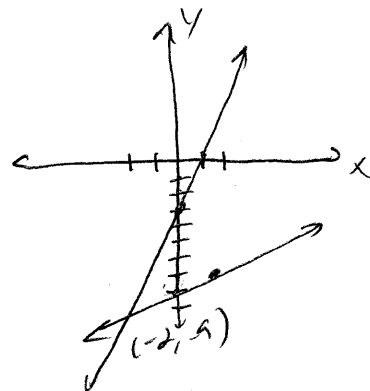
$x-2y=16$

$y+3=3x$

$-2y = -x + 16$

$y = 3x - 3$

$y = \frac{1}{2}x - 8$



By substitution

$x-2y=16$

$y = 3x - 3$

$x - 2(3x-3) = 16$

$x - 6x + 6 = 16$

$-5x + 6 = 16$

$-5x = 16 - 6$

$-5x = 10$ $y = 3(-2) - 3$

$x = -2$ $y = -9$

$(-2, -9)$

By addition

$x-2y=16$

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

$x-2y=16$

$-6x+2y = -3$

$-5x = 10$

$x = -2$

$2(-2) + y = -3$

$6 + y = -3$

$y = -9$

$(-2, -9)$

Question #20 continued

$$\begin{aligned}
 b.) & -3(x-3y=6) \\
 & 3x-9y=9 \\
 & -3x+9y=18 \\
 \hline
 & 3x-9y=9 \\
 & 0=27
 \end{aligned}$$

No solution

$$\begin{aligned}
 c.) & 3(2x+6y=8) \\
 & -2(3x+9y=12) \\
 & 6x+18y=24 \\
 & -6x-18y=-24 \\
 \hline
 & 0=0
 \end{aligned}$$

{(x,y) | 2x+6y=8}

$$\begin{aligned}
 d.) & 2(3x-5y=11) \\
 & -3(2x-6y=2) \\
 & 6x-10y=22 \\
 & -6x+18y=-6 \\
 \hline
 & 8y=16 \\
 & y=2
 \end{aligned}$$

$$\begin{aligned}
 2x-6(2) &= 2 \\
 2x-12 &= 2 \\
 2x &= 14 \\
 x &= 7
 \end{aligned}$$

(7,2)

Question #21

	rate	x	time	=	distance
upstream	$b-\cancel{c}$		10		d
downstream	$b+\cancel{c}$		4		d

$$10(b-c) = d = 4(b+c)$$

$$\begin{aligned}
 10(b-c) &= 4(b+c) \\
 10b-60 &= 4b+24 \\
 10b-60-4b &= 24 \\
 6b-60 &= 24 \\
 6b &= 24+60 \\
 6b &= 84 \\
 b &= 14
 \end{aligned}$$

The speed of the canoe in still water is 14 km/hr

Question #22

	%	x	whole	=	portion
0.40	x		0.4x		
0.10	y		0.1y		
0.25	10		2.5		

$$\begin{aligned}
 x+y &= 10 & 0.4x+0.1y &= 2.5 \\
 y &= 10-x
 \end{aligned}$$

$$\begin{aligned}
 0.4x+0.1(10-x) &= 2.5 \\
 0.4x+1-0.1x &= 2.5 \\
 0.3x+1 &= 2.5 \\
 0.3x &= 2.5-1 \\
 0.3x &= 1.5 \\
 \frac{0.3x}{0.3} &= \frac{1.5}{0.3} \\
 x &= 5
 \end{aligned}$$

$$\begin{aligned}
 y &= 10-5 \\
 y &= 5
 \end{aligned}$$

5Lb of the 40% mixture and 5Lb of the 10% mixture are needed.

Question #23

Quarter Pounder = q

Whopper = w

$$2q + 3w = 2607$$

$$-2(q + w = 1009)$$

$$2q + 3w = 2607$$

$$\underline{-2q - 2w = -2018}$$

$$w = 589$$

$$q + 589 = 1009$$

$$q = 1009 - 589$$

$$q = 420$$

A Quarter Pounder has 420 calories and a Whopper has 589 calories

Question #24

\$ x quantity = amount

$$6.00 \quad x \quad 6x$$

$$8.00 \quad y \quad 8y$$

$$7.50 \quad 144 \quad 1080$$

$$6x + 8y = 1080$$

$$\underline{-6(x + y = 144)}$$

$$6x + 8y = 1080$$

$$\underline{-6x - 6y = -864}$$

$$2y = 216$$

$$y = 108$$

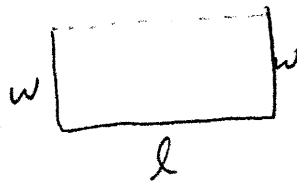
$$x + 108 = 144$$

$$x = 144 - 108$$

$$x = 36$$

36 lbs of the \$6 mixture and 108 lbs of the \$8 mixture are needed.

Question #25



$$2l + 2w = 360$$

$$20l + 8(2w) = 3280$$

$$\underline{-10(2l + 2w = 360)}$$

$$20l + 16w = 3280$$

$$\underline{-20l - 20w = -3600}$$

$$20l + 16w = 3280$$

$$\underline{-4w = -320}$$

$$w = 80$$

$$2l + 2(80) = 360$$

$$2l + 160 = 360$$

$$2l = 200$$

$$l = 100$$

The length is 100 ft and the width is 80 ft.

Question #26

$$\begin{matrix} C_1 & F_1 \\ (0, 32) & (100, 212) \end{matrix}$$

$$m = \frac{212 - 32}{100 - 0} = \frac{9}{5}$$

$$F - F_1 = m(C - C_1)$$

$$F - 32 = \frac{9}{5}(C - 0)$$

$$F - 32 = \frac{9}{5}C$$

$$F = \frac{9}{5}C + 32$$

$$70 = \frac{9}{5}C + 32$$

$$\frac{38}{9/5} = \frac{9}{9/5}C \quad C = \frac{190}{9} = 21\frac{10}{9}F$$

Question #27

$$t = 0 \text{ months } C = 70 \quad (0, 70)$$

$$t = 4 \text{ months } C = \$190 \quad (4, 190)$$

$$m = \frac{190 - 70}{4 - 0} = \frac{120}{4} = 30$$

$$C - C_1 = m(t - t_1)$$

$$C - 70 = 30(t - 0)$$

$$C - 70 = 30t$$

$$C = 30t + 70$$

$t = 9$ months

$$C = 30(9) + 70 = 270 + 70 = 340$$

The cost after 9 months is \$340.

Question #28

a) $5x + 1 \geq 3x - 9$

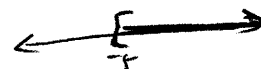
$$5x + 1 - 3x \geq -9$$

$$2x + 1 \geq -9$$

$$2x - 9 \geq -1$$

$$\frac{2x - 9}{2} \geq \frac{-1}{2}$$

$$x - 5 \geq -5$$



$$[-5, \infty)$$

Question #28 continued

b.) $4x - (6x + 1) \leq 8x + 2(x - 3)$

$4x - 6x - 1 \leq 8x + 2x - 6$

$-2x - 1 \leq 10x - 6$

$-2x - 1 - 10x \leq -6$

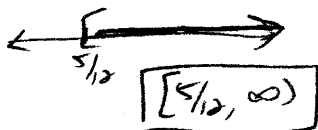
$-12x - 1 \leq -6$

$-12x \leq -6 + 1$

$-12x \leq -5$

$\frac{-12x}{-12} \geq \frac{-5}{-12}$

$x \geq 5/12$



c.) $-w + 12 + 9w > w + 9 + w$

$8w + 12 > 2w + 9$

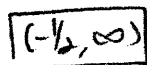
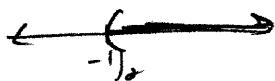
$8w + 12 - 2w > 9$

$6w + 12 > 9$

$6w > 9 - 12$

$\frac{6w}{6} > \frac{-3}{6}$

$w > -1/2$



d.) $2(x - 5) + 3x < 4(x - 6) + 1$

$2x - 10 + 3x < 4x - 24 + 1$

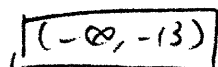
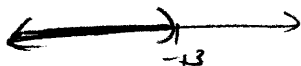
$5x - 10 < 4x - 23$

$5x - 10 - 4x < -23$

$x - 10 < -23$

$x < -23 + 10$

$x < -13$



e.) $5 < 1 - 6m < 12$

$5 < 1 - 6m$ and $1 - 6m < 12$

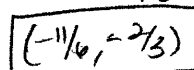
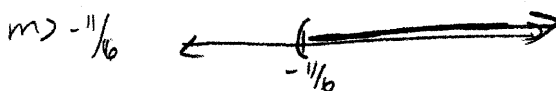
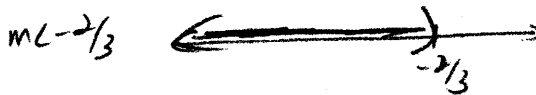
$5 - 1 < -6m$

$-6m < 12 - 1$

$\frac{4}{-6} < \frac{-6m}{-6}$

$\frac{-6m}{-6} < \frac{11}{-6}$

$-\frac{2}{3} > m$ and $m > -11/6$



f.) $-7 \leq 3x - 4 \leq 8$

$-7 \leq 3x - 4$ and $3x - 4 \leq 8$

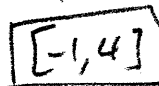
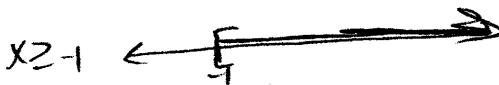
$-7 + 4 \leq 3x$

$3x \leq 8 + 4$

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

$\frac{3x}{3} \leq \frac{12}{3}$

$-1 \leq x$ and $x \leq 4$



Question #28 continued

g) $2 < 6 + \frac{3}{4}x \leq 12$

$2 < 6 + \frac{3}{4}x$ and $6 + \frac{3}{4}x \leq 12$

$2 - 6 < \frac{3}{4}x$

$\frac{3}{4}x \leq 12 - 6$

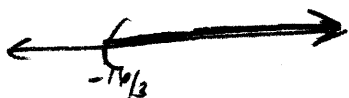
$\frac{-4 < \frac{3}{4}x}{\frac{3}{4} \quad \frac{4}{3/4}}$

$\frac{\frac{3}{4}x \leq 6}{\frac{4}{3/4} \quad \frac{4}{3/4}}$

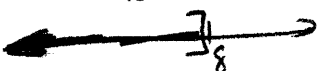
$-\frac{16}{3} < x$

and $x \leq 8$

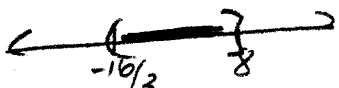
$x > -16/3$



$x \leq 8$



and



$[-16/3, 8]$

h) $-12 \leq \frac{3}{7}x + 2 < -4$

$-12 \leq \frac{3}{7}x + 2$ and $\frac{3}{7}x + 2 < -4$

$-12 - 2 \leq \frac{3}{7}x$

$\frac{3}{7}x < -4 - 2$

$\frac{-14 \leq \frac{3}{7}x}{\frac{3}{7} \quad \frac{7}{3/7}}$

$\frac{\frac{3}{7}x < -6}{\frac{7}{3/7} \quad \frac{7}{3/7}}$

$-\frac{98}{3} \leq x$

$x < -14$

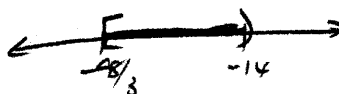
$x \geq -98/3$



$x < -14$



and



$[-98/3, -14)$

Question #29

a) $6 - 5x > 1 - 3x$ and $4x - 3 > x - 9$

$6 - 5x + 3x > 1$

$4x - 3 - x > -9$

$6 - 2x > 1$

$3x - 3 > -9$

$-2x > 1 - 6$

$3x > -9 + 3$

$-2x > -5$

$\frac{3x > -6}{\frac{3}{3} \quad \frac{3}{3}}$

$\frac{-2x > -5}{-2 \quad -2}$

$x < 5/2$

and $x > -2$

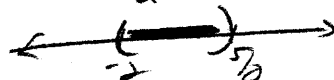
$x < 5/2$



$x > -2$



and



$(-2, 5/2)$

b) $3 \leq 4x - 3 < 19$

$3 \leq 4x - 3$ and $4x - 3 < 19$

$3 + 3 \leq 4x$

$4x < 19 + 3$

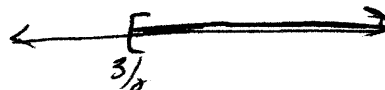
$\frac{6 \leq 4x}{\frac{4}{4} \quad \frac{4}{4}}$

$\frac{4x < 22}{\frac{4}{4} \quad \frac{4}{4}}$

$\frac{3}{2} \leq x$

and $x < 11/2$

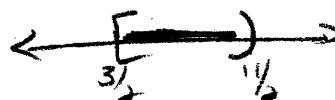
$x \geq 3/2$



$x < 11/2$



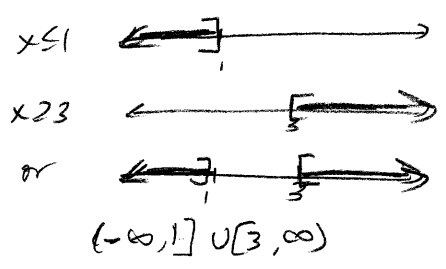
and



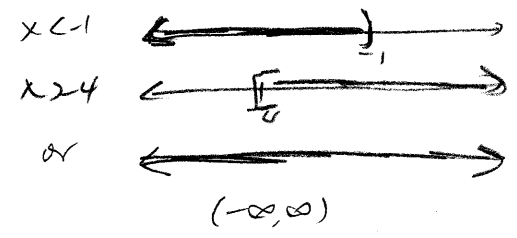
$[3/2, 11/2)$

Question #29 continued

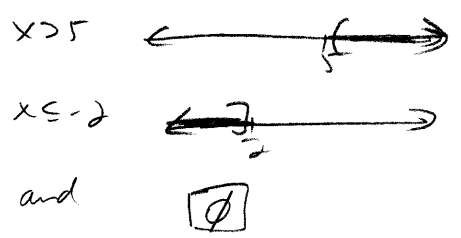
c.) $3x + 2 \leq 5$ or $5x - 7 \geq 8$
 $3x \leq 5 - 2$ $5x \geq 8 + 7$
 $\frac{3x \leq 3}{3 \quad 3}$ $\frac{5x \geq 15}{5 \quad 5}$
 $x \leq 1$ or $x \geq 3$



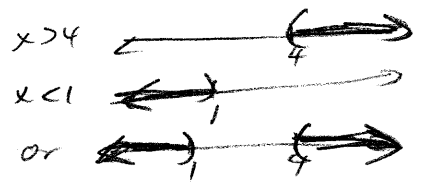
d.) $4x + 3 < -1$ or $2x - 3 \geq -11$
 $4x < -1 - 3$ $2x \geq -11 + 3$
 $\frac{4x < -4}{4 \quad 4}$ $\frac{2x \geq -8}{2 \quad 2}$
 $x < -1$ or $x \geq -4$



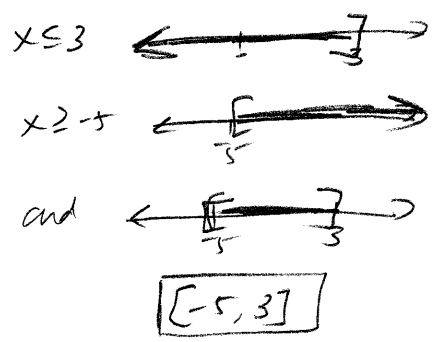
e.) $5(x - 2) > 15$ and $\frac{x - 6}{4} \leq -2$
 $5x - 10 > 15$ $x - 6 \leq -8$
 $5x > 15 + 10$ $x \leq -8 + 6$
 $\frac{5x > 25}{5 \quad 5}$ $x \leq -2$
 $x > 5$ and $x \leq -2$



f.) $|2x - 5| > 3$
 $2x - 5 > 3$ or $2x - 5 < -3$
 $2x > 3 + 5$ $2x < -3 + 5$
 $\frac{2x > 8}{2 \quad 2}$ $\frac{2x < 2}{2 \quad 2}$
 $x > 4$ or $x < 1$



g.) $|2x - 1| + 4 \leq 8$
 $|2x - 2 + 4| \leq 8$
 $|2x + 2| \leq 8$
 $2x + 2 \leq 8$ and $2x + 2 \geq -8$
 $2x \leq 8 - 2$ $2x \geq -8 - 2$
 $\frac{2x \leq 6}{2 \quad 2}$ $\frac{2x \geq -10}{2 \quad 2}$
 $x \leq 3$ and $x \geq -5$



h.) $|3x - 5| > -3$ always true
 $(-\infty, \infty)$

i.) $|6x + 2| \leq -5$ never true
 \emptyset

Question #30

a.) $|4x - 3| = 9$

$4x - 3 = 9$ or $4x - 3 = -9$

$4x = 9 + 3$

$4x = -9 + 3$

$\frac{4x}{4} = \frac{12}{4}$

$\frac{4x}{4} = \frac{-6}{4}$

$x = 3$ or $x = -\frac{3}{2}$

b.) $\frac{3|2x-1|}{3} = \frac{21}{3}$

$|2x-1| = 7$

$2x-1 = 7$ or $2x-1 = -7$

$2x = 7+1$

$2x = -7+1$

$\frac{2x}{2} = \frac{8}{2}$

$\frac{2x}{2} = \frac{-6}{2}$

$x = 4$ or $x = -3$

c.) $|4x-9| = |2x+1|$

$4x-9 = 2x+1$ or $4x-9 = -(2x+1)$

$4x-9-2x = 1$ or $4x-9 = -2x-1$

$2x-9 = 1$

$4x-9+2x = -1$

$2x = 1+9$

$6x-9 = -1$

$\frac{2x}{2} = \frac{10}{2}$

$6x = -1+9$

$x = 5$ or $x = \frac{4}{3}$

d.) $|x+1| \neq 5 = 3$

$|x+1| = 3-5$

$|x+1| = -2$ Never true

\emptyset

Question #31

a.) $2x - 3y \geq 6$
 $3x + 5y \leq 10$

$2x - 3y \geq 6$

$\frac{-3y}{-3} \geq \frac{-2x+6}{-3}$

$y \leq \frac{2}{3}x - 2$

$3x + 5y \leq 10$

$\frac{5y}{5} \leq \frac{-3x+10}{5}$

$y \leq -\frac{3}{5}x + 2$

Test (0,0):

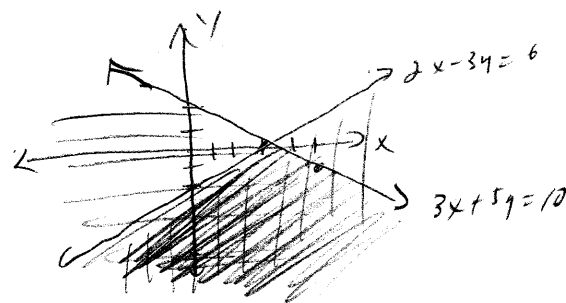
$2(0) - 3(0) \geq 6$

$0 \geq 6$ False

Test (0,0)

$3(0) + 5(0) \leq 10$

$0 \leq 10$ True



b.) $2x - y \leq 4$
 $3x + 2y > -6$

$2x - y \leq 4$

$\frac{-y}{-1} \leq \frac{-2x+4}{-1}$

$y \geq 2x - 4$

$3x + 2y > -6$

$\frac{2y}{2} > \frac{-3x-6}{2}$

$y > -\frac{3}{2}x - 3$

Test (0,0)

$2(0) - 0 \leq 4$

$0 \leq 4$ True

Test (0,0)

$3(0) + 2(0) > -6$

$0 > -6$ True

