

Question #1

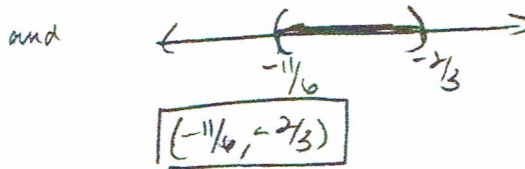
a.) $5 < 1 - 6m < 12$

$5 < 1 - 6m$ 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 $m > -\frac{11}{6}$



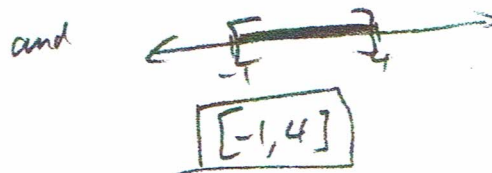
b.) $-7 \leq 3x - 4 \leq 8$

$-7 \leq 3x - 4$ 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 #1 continued

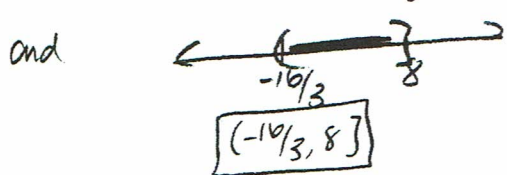
c) $2 < 6 + \frac{3}{4}x \leq 12$

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

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

$\frac{-4 < \frac{3}{4}x}{\frac{3}{4} \quad \frac{3}{4}}$ $\frac{\frac{3}{4}x \leq 6}{\frac{3}{4} \quad \frac{3}{4}}$

$-\frac{16}{3} < x$ and $x \leq 8$



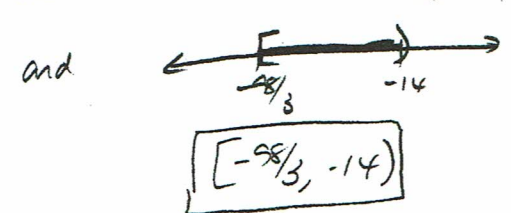
d) $-12 \leq \frac{3}{7}x + 2 < -4$

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

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

$\frac{-14 \leq \frac{3}{7}x}{\frac{3}{7} \quad \frac{3}{7}}$ $\frac{\frac{3}{7}x < -6}{\frac{3}{7} \quad \frac{3}{7}}$

$-\frac{98}{3} \leq x$ and $x < -14$



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

$6 - 5x + 3x > 1$

$6 - 2x > 1$

$-2x > 1 - 6$

$-2x > -5$

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

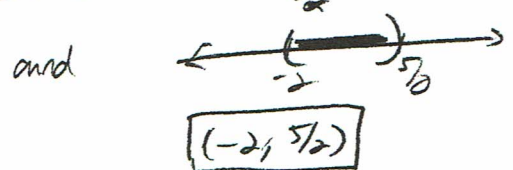
$4x - 3 - x > -9$

$3x - 3 > -9$

$3x > -9 + 3$

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

and $x > -2$



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

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

$3 + 3 \leq 4x$

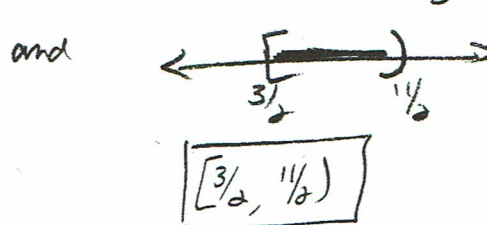
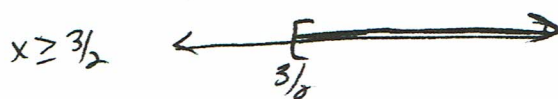
$\frac{6 \leq 4x}{4 \quad 4}$

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

$4x < 19 + 3$

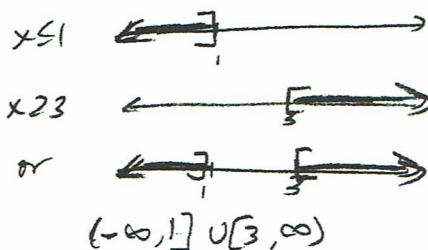
$\frac{4x < 22}{4 \quad 4}$

and $x < 11/2$

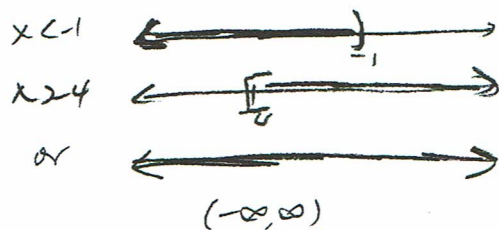


Question # (continued)

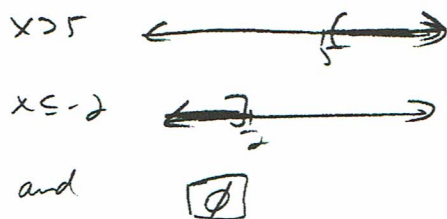
g) $3x + 2 \leq 5$ or $5x - 7 \geq 8$
 $3x \leq 5 - 2$ $5x \geq 8 + 7$
 $\frac{3x}{3} \leq \frac{3}{3}$ $\frac{5x}{5} \geq \frac{15}{5}$
 $x \leq 1$ or $x \geq 3$



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



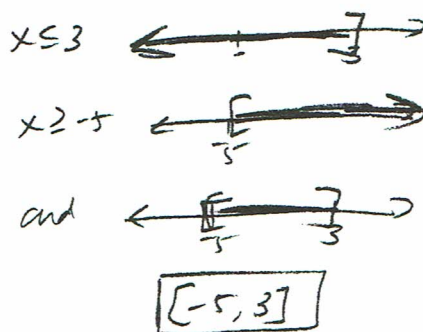
i.) $5(x - 2) > 15$ and $\frac{x - 6}{4} \leq -2$
 $5x - 10 > 15$ $x - 6 \leq -8$
 $5x > 15 + 10$ $x \leq -8 + 6$
 $\frac{5x}{5} > \frac{25}{5}$ $x \leq -2$
 $x > 5$ and $x \leq -2$



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



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



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

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

Question #2

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

$$4x-3=9 \text{ OR } 4x-3=-9$$

$$4x=9+3 \quad 4x=-9+3$$

$$\frac{4x}{4}=\frac{12}{4} \quad \frac{4x}{4}=\frac{-6}{4}$$

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

b.) $\frac{3|2x-1|=21}{3 \quad 3}$
 $|2x-1|=7$

$$2x-1=7 \text{ OR } 2x-1=-7$$

$$2x=7+1 \quad 2x=-7+1$$

$$\frac{2x}{2}=\frac{8}{2} \quad \frac{2x}{2}=\frac{-6}{2}$$

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

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

$$4x-9=2x+1 \text{ OR } 4x-9=-(2x+1)$$

$$4x-9-2x=1 \quad 4x-9=-2x-1$$

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

$$2x=1+9 \quad 6x-9=-1$$

$$2x=10 \quad 6x=8$$

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

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

$$|x+1|=3-5$$

$$|x+1|=-2 \quad \emptyset$$

Question #3 out of Exam #2!

Question #4

a.) $(-9xy^2 - xy + 6x^2y) + (-5x^2y - xy + 4xy^2) + (12x^2y - 3xy^2 + 6xy) = -8xy^2 + 4xy + 13x^2y$

b.) $(8x^2 - 4xy + y^2) - (2x^2 + 3xy - 2y^2)$
 $(8x^2 - 4xy + y^2) + (-2x^2 - 3xy + 2y^2)$
 $6x^2 - 7xy + 3y^2$

e.) $(x^2 - 2x + 1)(x^2 + x + 2)$
 $x^4 + x^3 + 2x^2 - 2x^3 - 2x^2 - 4x + x^2 + x + 2$
 $x^4 - x^3 + x^2 - 3x + 2$

c.) $(y + 8x)(2y - 7x)$
 $2y^2 - 7xy + 16xy - 56x^2$
 $2y^2 + 9xy - 56x^2$

f.) $(x^3 - 2x^2 + 2x - 5) \div (x+1)$

$$\begin{array}{r} x^2 - 3x + 5 \\ x+1 \overline{) x^3 - 2x^2 + 2x - 5} \\ \underline{-(x^3 + x^2)} \\ -3x^2 + 2x \\ \underline{-(-3x^2 - 3x)} \\ 5x - 5 \\ \underline{-(5x + 5)} \\ -10 \end{array}$$

 $x^2 - 3x + 5 - \frac{10}{x+1}$

d.) $(x+1)(x-1)(x^2+1)$
 $(x^2-1)(x^2+1)$
 $x^4 + x^2 - x^2 - 1$
 $x^4 - 1$

Question #4 continued

g.) $(3x^4 + 2x^3 - 11x^2 - 2x + 5) \div (x^2 - 2)$

$$\begin{array}{r} 3x^2 + 2x - 5 \\ x^2 + 0x - 2 \overline{) 3x^4 + 2x^3 - 11x^2 - 2x + 5} \\ \underline{-(3x^4 + 0x^3 - 6x^2)} \\ 2x^3 - 5x^2 - 2x \\ \underline{-(2x^3 + 0x^2 - 4x)} \\ -5x^2 + 2x + 5 \\ \underline{-(-5x^2 + 0x + 10)} \\ 2x - 5 \end{array}$$

$$\boxed{3x^2 + 2x - 5 + \frac{2x - 5}{x^2 - 2}}$$

l.) $6x^2 - 7xy - 5y^2$
 $\boxed{(3x - 5)(2y + 1)}$

m.) $(x - 6)^2 - 4^2$
 $(x - 6 + 4)(x - 6 - 4)$
 $\boxed{(x - 6 + 4)(x - 6 - 4)}$

n.) $64x^2 - 16y^2$
 $16(4x^2 - y^2)$
 $\boxed{16(2x + y)(2x - y)}$

o.) $x^2 - 14x + 49$
 $\boxed{(x - 7)^2}$

p.) $9x^2 + 48xy + 64y^2$
 $\boxed{(3x + 8y)^2}$

q.) $2x^3y - 32xy$
 $2xy(x^2 - 16)$
 $\boxed{2xy(x + 4)(x - 4)}$

r.) $x^2 - 12x + 36 - y^2$
 $(x^2 - 12x + 36) - y^2$
 $(x - 6)^2 - y^2$
 $(x - 6 + y)(x - 6 - y)$
 $\boxed{(x - 6 + y)(x - 6 - y)}$

Question #5

a.) $2w^3 - 2w^2 + 3w - 3$
 $(2w^3 - 2w^2) + (3w - 3)$
 $2w^2(w - 1) + 3(w - 1)$
 $\boxed{(w - 1)(2w^2 + 3)}$

b.) $15x^2 - 14x - 8$
 $\boxed{(5x + 2)(3x - 4)}$

c.) $-3x^3 + 27x$
 $-3x(x^2 - 9)$
 $\boxed{-3x(x + 3)(x - 3)}$

d.) $9x^2 - 12xy + 4y^2$
 $\boxed{(3x - 2y)^2}$

e.) $x^2 - 12x - 28$
 $\boxed{(x - 14)(x + 2)}$

f.) $y^3 + 5y^2 - 4y - 20$
 $(y^3 + 5y^2) - (4y + 20)$
 $y^2(y + 5) - 4(y + 5)$
 $(y + 5)(y^2 - 4)$
 $\boxed{(y + 5)(y + 2)(y - 2)}$

g.) $24x^2 - 46x + 10$
 $2(12x^2 - 23x + 5)$
 $\boxed{2(4x - 1)(3x - 5)}$

h.) $x^8 - y^8$
 $(x^4)^2 - (y^4)^2$
 $(x^4 + y^4)(x^4 - y^4)$
 $(x^2)^2 - (y^2)^2$
 $(x^4 + y^4)(x^2 + y^2)(x^2 - y^2)$
 $\boxed{(x^4 + y^4)(x^2 + y^2)(x + y)(x - y)}$

i.) $27x^3 - 64y^3$
 $(3x)^3 - (4y)^3$
 $\boxed{(3x - 4y)(9x^2 + 12xy + 16y^2)}$

j.) $m^6 + 8m^3 - 20$
 $\boxed{(m^3 + 10)(m^3 - 2)}$

k.) $10x^2 + 19x + 6$
 $\boxed{(5x + 2)(2x + 3)}$

Question #6

a.) $9x^2 = 30x - 25$
 $9x^2 - 30x + 25 = 0$
 $(3x - 5)^2 = 0$
 $3x - 5 = 0$
 $\boxed{x = \frac{5}{3}}$

Question #6

b.) $(x-3)(x+2)=14$
 $x^2-x-6=14$
 $x^2-x-6-14=0$
 $x^2-x-20=0$
 $(x-5)(x+4)=0$
 $x-5=0$ OR $x+4=0$
 $x=5$ OR $x=-4$

c.) $x^2-49=0$
 $(x+7)(x-7)=0$
 $x+7=0$ OR $x-7=0$
 $x=-7$ OR $x=7$

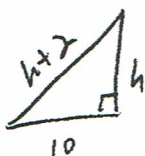
d.) $(x+1)^2-5(x+2)=3x+7$
 $x^2+2x+1-5x-10=3x+7$
 $x^2-3x-9=3x+7$
 $x^2-3x-9-3x-7=0$
 $x^2-6x-16=0$
 $(x-8)(x+2)=0$
 $x-8=0$ OR $x+2=0$
 $x=8$ OR $x=-2$

e.) $x^3+2x^2=16x+32$
 $x^3+2x^2-16x-32=0$
 $(x^3+2x^2)-(16x+32)=0$
 $x^2(x+2)-16(x+2)=0$
 $(x+2)(x^2-16)=0$
 $(x+2)(x+4)(x-4)=0$
 $x+2=0$ OR $x+4=0$ OR $x-4=0$
 $x=-2$ OR $x=-4$ OR $x=4$

f.) $3x^3-9x^2-30x=0$
 $3x(x^2-3x-10)=0$
 $3x(x-5)(x+2)=0$
 $3x=0$ OR $x-5=0$ OR $x+2=0$
 $x=0$ OR $x=5$ OR $x=-2$

Question #7 (not on exam)

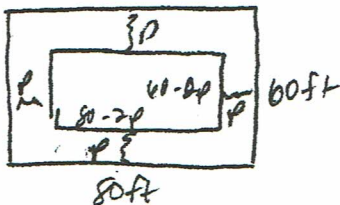
height = h



$h^2+10^2=(h+2)^2$
 $h^2+100=h^2+4h+4$
 $0=h^2+4h+4-h^2-100$
 $0=4h-96$
 $0=4(h-24)$
 $4=0$ OR $h-24=0$
 $h=24$

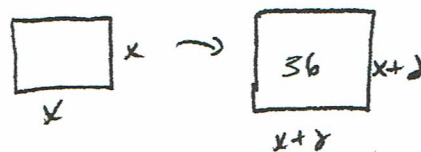
It reaches 24 ft up the wall.

Question #8 (not on exam)



$\frac{1}{2}$ of Area = $\frac{1}{2}(80 \cdot 60) = 2400 \text{ ft}^2$
 $(80-2p)(60-2p) = 2400$
 $4800 - 280p + 4p^2 = 2400$
 $4p^2 - 280p + 4800 - 2400 = 0$
 $4p^2 - 280p + 2400 = 0$
 $4(p^2 - 70p + 600) = 0$

Question #9



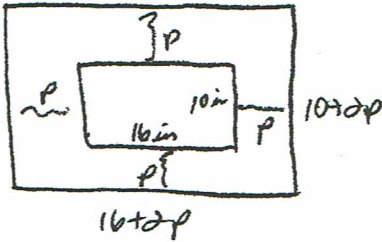
$(x+2)^2=36$
 $x^2+4x+4=36$
 $x^2+4x+4-36=0$
 $x^2+4x-32=0$
 $(x+8)(x-4)=0$
 $x+8=0$ OR $x-4=0$
 $x=-8$ OR $x=4$

cannot apply

The length is 4 in

$4(p-10)(p-60)=0$
 $4=0$ OR $p-10=0$ OR $p-60=0$
 $p=10$ OR $p=60$
 cannot apply
 length = $80-2(10) = 60 \text{ ft}$
 width = $60-2(10) = 40 \text{ ft}$
 The length is 60 ft and the width is 40 ft.
 The path is 10 ft wide

Question #10 (not on exam)



$$(10+2p)(16+2p) = 280$$

$$160 + 52p + 4p^2 = 280$$

$$4p^2 + 52p + 160 - 280 = 0$$

$$4p^2 + 52p - 120 = 0$$

$$4(p^2 + 13p - 30) = 0$$

$$4(p+15)(p-2) = 0$$

4=0 or p+15=0 or p-2=0
 X p=-15 or p=2
 ↑
 Cannot apply

The frame is 2 in wide.

c.) $\frac{4}{x+1} + \frac{x+2}{x^2-1} + \frac{3}{x-1}$

LCM = (x+1)(x-1)

$$\frac{4(x-1)}{(x+1)(x-1)} + \frac{x+2}{(x+1)(x-1)} + \frac{3(x+1)}{(x+1)(x-1)}$$

$$\frac{4x-4}{(x+1)(x-1)} + \frac{x+2}{(x+1)(x-1)} + \frac{3x+3}{(x+1)(x-1)}$$

$$\frac{(4x-4) + (x+2) + (3x+3)}{(x+1)(x-1)}$$

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

d.) $\frac{a-3}{a^2-16} - \frac{3a-2}{a^2+4a-20}$

LCM = (a+4)(a-4)(a+6)

$$\frac{(a-3)(a+6)}{(a+4)(a-4)(a+6)} - \frac{(3a-2)(a+4)}{(a+4)(a-4)(a+6)}$$

$$\frac{a^2+3a-18}{(a+4)(a-4)(a+6)} - \frac{3a^2+10a-8}{(a+4)(a-4)(a+6)}$$

$$\frac{(a^2+3a-18) - (3a^2+10a-8)}{(a+4)(a-4)(a+6)}$$

$$\frac{(a^2+3a-18) + (-3a^2-10a+8)}{(a+4)(a-4)(a+6)}$$

$$\frac{-2a^2-7a-10}{(a+4)(a-4)(a+6)}$$

$$\frac{-(2a^2+7a+10)}{(a+4)(a-4)(a+6)}$$

Question #11

a.) $\frac{3x-6}{5x} \cdot \frac{x^5}{5x-10}$

$$\frac{3(x-2) \cdot x^5}{5x \cdot 5(x-2)} = \frac{3x^4}{25}$$

b.) $\frac{x^2-16}{x^2-10x+25} \div \frac{3x-12}{x^2-3x-10}$

$$\frac{(x^2-16)(x^2-3x-10)}{(x^2-10x+25)(3x-12)}$$

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

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

Question #1 (continued)

a) $\frac{4}{x^2-1} - \frac{3}{x+1}$

$\frac{5}{x^2-1} - \frac{2}{x-1}$

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

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

$(x+1)(x-1) \left[\frac{4}{(x+1)(x-1)} - \frac{3}{x+1} \right]$

$(x+1)(x-1) \left[\frac{5}{(x+1)(x-1)} - \frac{2}{x-1} \right]$

$\frac{\left(\frac{4}{(x+1)(x-1)}\right)(x+1)(x-1) - \left(\frac{3}{x+1}\right)(x+1)(x-1)}{(x+1)(x-1)}$

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

$\frac{4 - 3(x-1)}{5 - 2(x+1)}$

$\frac{4 - 3x + 3}{5 - 2x - 2}$

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

f.) $\frac{x^{-1} + y^{-1}}{\frac{x^2 - y^2}{xy}}$

$\frac{\frac{1}{x} + \frac{1}{y}}{\frac{x^2 - y^2}{xy}}$ LCD = xy

$xy \left(\frac{1}{x} + \frac{1}{y} \right)$

$xy \left(\frac{x^2 - y^2}{xy} \right)$

$\frac{\left(\frac{1}{x}\right)xy + \left(\frac{1}{y}\right)xy}{\left(\frac{x^2 - y^2}{xy}\right)xy}$

$\frac{y + x}{x^2 - y^2}$

$\frac{y + x}{x^2 - y^2}$

$\frac{y + x}{(x+y)(x-y)}$

$\boxed{\frac{1}{x-y}}$

Question #22

length = l $l = 3 + w$
width = w

$A = lw$

$28 = (3+w)w$

$28 = w^2 + 3w$

$0 = w^2 + 3w - 28$

$0 = (w+7)(w-4)$

$w+7=0$ $w-4=0$

$w=-7$ $w=4$

x $l = 3 + w$

$l = 3 + 4 = 7$

The width is 4 inches and the length is 7 inches

Question #23

a.) $f(x) = \frac{3}{2x-5}$ $2x-5=0$
 $2x=5$
 $x=5/2$

Domain $f = \{x | x \neq 5/2\}$

b.) $f(x) = \frac{2x+1}{x^2-5x+4}$ $x^2-5x+4=0$
 $(x-4)(x-1)=0$

$x-4=0$ $x-1=0$

$x=4$ $x=1$

$\{x | x \neq 1, 4\}$

c.) $f(x) = \frac{7x}{5-x}$ $5-x=0$
 $5=x$

$\{x | x \neq 5\}$

Question #12 - 21 not on Exam #2

Question #21

length = l $w = l - 3$ $v = lwh$

width = w $h = 2$ $v = l(l-3)(2)$

$80 = 2l(l-3)$

$80 = 2l^2 - 6l$

$0 = 2l^2 - 6l - 80$

$0 = 2(l^2 - 3l - 40)$

$0 = 2(l-8)(l+5)$

$2=0$ $l-8=0$ $l+5=0$

x $l=8$ $l=-5$

$w = l - 3$

$w = 8 - 3 = 5$

The length is 8 ft and the width is 5 ft.