Translating Equations & Inequalities

5 = 3n = 14

1. The quotient of twice a number and 7 is 20. $\frac{2x}{7} = 20$	**2.** Five less than the product of a number and 3 is 14. $3n - 5 = 14$
3. Seven times the difference of x and 4 is -10. $7(x-4) = -10$	**4.** The product of a number and four increased by one is at least 7. $4x + 1 \geq 7$

Unit 3: Equations

Equations

1. $18 = 3 - 3a$

$-3 \quad -3$

$\frac{15}{-3} = \frac{-3a}{-3}$

$-5 = a$

$a = -5$

2. $4 - \frac{1}{2}n = -12$

$4 - \frac{1}{2}n = -12$

$-4 \qquad -4$

$(-2)\left(-\frac{1}{2}n\right) = -16(-2)$

$n = 32$

3. $\frac{3}{4}x + 17 = 23$

$-17 \quad -17$

$\left(\frac{4}{3}\right)\frac{3}{4}x = 6\left(\frac{4}{3}\right)$

$x = 8$

4. $9y - 4(y + 1) = 31$

$9y - 4(y+1) = 31$

$9y - 4y - 4 = 31$

$5y - 4 = 31$

$+4 \quad +4$

$\frac{5y}{5} = \frac{35}{5}$

$y = 7$

5. $-6(w-4)+8w=2(w+9)$

$-6w+24+8w=2w+18$

$2w+24=2w+18$

$-2w \quad -2w$

$24=18$

No Solution

6. $3m(-7m+12)=2(m-3)$

$3m-7m-12=2m-6$

$-4m-12=2m-6$

$-2m \quad -2m$

$-6m-12=-6$

$+12 \quad +12$

$\frac{-6m}{-6}=\frac{6}{-6}$

$m=-1$

7. $2x - 2(4x - 3) = 6 - 6x$

$2x - 8x + 6 = 6 - 6x$

$-6x + 6 = 6 - 6x$

$+6x \qquad +6x$

$6 = 6$ ✓

Infinite Solutions

Proportion ....

CROSS MULTIPLY!!!

8. $\frac{7}{x-8} = \frac{3}{x}$

$7x = 3(x-8)$

$7x = 3x - 24$

$-3x \quad -3x$

$\frac{4x}{4} = \frac{-24}{4}$

$x = -6$

9. Given $A = \frac{1}{2}bh$, solve for h

$2 \cdot A = \frac{1}{2}bh \cdot 2$

$\frac{2A}{b} = \frac{bh}{b}$

$\frac{2A}{b} = h$

$h = \frac{2A}{b}$

10. Given $K = \frac{mv^2}{2}$, solve for m

$2 \cdot K = \frac{mv^2}{2} \cdot 2$

$\frac{2K}{v^2} = \frac{mv^2}{v^2}$

$\frac{2K}{v^2} = m$

$m = \frac{2K}{v^2}$

Unit 4: Word Problems

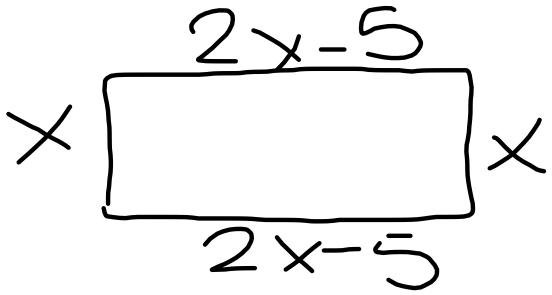
1. Max is making a rectangular garden that is 5 feet less than twice its width. If the perimeter of the garden is 80 feet, what will be its dimensions?

x

Add all the sides

$l = 2x - 5$

$w = x$



$80 = 2x - 5 + x + 2x - 5 + x$

$80 = 6x - 10$

$+10 \quad +10$

$\frac{90}{6} = \frac{6x}{6}$

$x = 15$

$2x - 5 =$

$2(15) - 5 = 25$

$l = 25$

$w = 5$

2. Amie published her first book. She was given $20,000 and an additional $0.15 for each copy of the book that sold. Her earnings, d, in dollars, from the publication of the book are given by **d = 20,000 + 0.15n** where n is the number of copies sold. During the first year, Amie earned $22,100 from the publication and sale of her book. How many copies of her book were sold?

d

n

$$d = 20{,}000 + 0.15n$$

$$22{,}100 = 20{,}000 + 0.15n$$

$$-20{,}000 \quad -20{,}000$$

$$\frac{2{,}100}{0.15} = \frac{0.15n}{0.15}$$

$$14{,}000 = n$$

14,000 Books

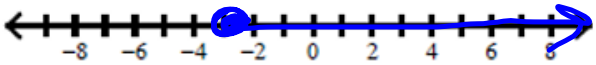
Unit 5: Inequalities

1. $11x + 13 \geq -20$

$-13 \quad -13$

$\frac{11x}{11} \geq \frac{-33}{11}$

$x \geq -3$



Shade →

2. $-2x + 6 > 3x - 34$

$-3x \quad -3x$

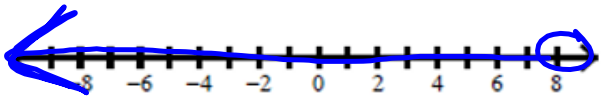
$-5x + 6 > -34$

$-6 \quad -6$

$\frac{-5x}{-5} > \frac{-40}{-5}$

$x < 8$

Flip the inequality symbol



←

3. $3x - 7(x + 3) \geq -13$

$3x - 7x - 21 \geq -13$

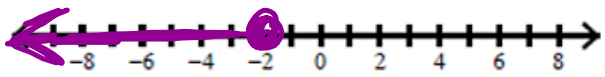
$-4x - 21 \geq -13$

$+21 \quad +21$

$-4x \geq 8$

$\frac{-4x}{-4} \geq \frac{8}{-4}$

$x \leq -2$



4. $4 - 8x < 2(5 - 3x)$