Algebra 1 Review **Chapter 1: Equations** **SHOW YOUR WORK**
Chapter 2: Inequalities

Name: Key **Date:** _____ **Block:** _____

1)

Astronomers talk about the *luminosity* of a star, which is a measure of how much energy the star puts out, and the *brightness* of a star, which is a measure of how intense the star's light is. The formula $b = \frac{L}{4\pi d^2}$ relates the brightness b of a star to its luminosity L and its distance from the Earth, d.

a. Solve the equation for L.

b. If d is measured in meters and b is measured in watts per meter squared, what units is L measured in?

(a) $b = \frac{L}{4\pi d^2}$ · $4\pi d^2$

$4\pi b d^2 = L$

$L = 4\pi b d^2$

(b) $L = 4\pi \cdot \frac{W}{m^2} \cdot m^2$

L = watts

watts

2)

A certain breakfast cereal has 9.0 g of protein in a 120-g serving. How many grams of protein are in a 200-oz serving? (1 oz ≈ 28.3 g)

$\frac{9\text{ g pro}}{120\text{ g/serv}} \cdot \frac{28.3\text{ g}}{1\text{ oz}} = \frac{254.7}{120} = 2.1225\text{ g/oz}$

$\frac{2.1225\text{ g}}{\text{oz}} \cdot 200\text{ oz} = 424.5\text{ g protein}$

3)

A theater company put on a play, and charged the prices shown in the table for tickets.

Ticket Prices		
Child	Adult	Senior
$2.50	$6.00	$3.50

a. Write an equation for the total revenue R for C children, A adults, and S seniors.

b. There were 4 times as many adults as children, and half as many seniors as adults. Write expressions for the number of children and the number of seniors in terms of the number of adults.

c. Rewrite your equation from part a in terms of A, the number of adults.

d. If the company made a total of $301.50, how many children attended? ~~Explain how you found your answer.~~

(a) $R = 2.50C + 6.00A + 3.50S$

(b) $4C = A$ $\quad S = \frac{1}{2}A$

$C = \frac{A}{4}$

(c) $R = 2.50\left(\frac{A}{4}\right) + 6.00A + 3.50\left(\frac{1}{2}A\right)$

$R = 0.625A + 6.00A + 1.75A$

$R = 8.375A$

(d) $\frac{301.50}{8.375} = \frac{8.375A}{8.375}$

$36 = A$

$C = \frac{36}{4} = 9$

9 children

4)

Sariq's last four test scores in history were 87, 85, 91, and 88. What scores on his next test will give him an average of 90 or above? Write and solve an inequality. Show your work.

x = next test score

$$\frac{87 + 85 + 91 + 88 + x}{5} \geq 90$$

$$5 \cdot \frac{351 + x}{5} \geq 90 \cdot 5$$

$351 + x \geq 450$

$-351 \quad -351$

$x \geq 99$

99 or higher

5)

Fernando is starting a new sales job, and needs to decide which of two salary plans to choose from. For plan A, he will earn $100/week plus 15% commission on all sales. For plan B, he will earn $150/week plus 10% commission on all sales.

a. Write an expression for each salary plan if s is Fernando's total weekly sales.

b. For what amount of weekly sales is plan B better than plan A?

(a) A: $100 + 0.15s$

B: $150 + 0.10s$

(b) $B > A$

$150 + 0.10s > 100 + 0.15s$

$-0.10s \quad -0.10s$

$150 > 100 + 0.05s$

$-100 \quad -100$

$50 > 0.05s$

$\frac{50}{0.05} > \frac{0.05s}{0.05}$

$1000 > s$

$s < 1000$

Less than $1000 in sales

6)

An electronics company has developed a new hand-held device. The company predicts that the start-up cost to manufacture the new product will be $125,000, and the cost to make one device will be $6.50.

a. If the company plans on selling the devices at a price of $9, write and solve an inequality to determine how many must be sold for the company to make a profit. Show your work.

b. The cost of one device is 10% more than the company predicted. What is the new cost of making one device? How many devices must they now sell at the same price to make a profit?

(a) x = # of devices

$9x > 125000 + 6.50x$

$-6.50x \quad -6.50x$

$2.5x > 125000$

$\frac{2.5x}{2.5} > \frac{125000}{2.5}$

$x > 50000$

More than 50,000 devices

(b) $6.50 \cdot 0.10 = 0.65$

$6.50 + 0.65 = 7.15$

$9x > 125000 + 7.15x$

$-7.15x \quad -7.15x$

$1.85x > 125000$

$\frac{1.85x}{1.85} > \frac{125000}{1.85}$

$x > 67567.5$

More than 67,567 devices