

Name: _____

Equations and Inequalities Day 3: Literal Equations and Inequalities

Basic Equations to Solve for x

1. Solve the following equations for x . It may help to make up an equation with numbers and solve it to the side to make sure you are not making any mistakes.

(a) $\frac{x+a}{b} - c = d$

(b) $2x - h + k = 8$

(c) $ax + b = c$

(d) $\frac{l}{x} = R$

Equations That Require the Distributive Property Near the Beginning

1. Solve the following equations for x . The distributive property is necessary to “get rid of” the parenthesis. However, the distributive property need not be the *first* step. For example, if there is a letter in the denominator, it may help to multiply both sides by that letter first to get rid of it.

(a) $2(x - h) + k = 8$

(b) $a(x + b) - c = d$

(c) $\frac{e(x+c)}{b} = 2$

(d) $\frac{3(x-k)}{w} = 4$

Equations That Require Factoring

1. Solve the following equations for x . It will be necessary to factor so that there is only one x term in the equation.

(a) $ax + b = cx + d$

(b) $rx + qx - d = gc$

(c) $ax - k = 3(x + h)$

(d) $\frac{ax}{b} + \frac{cx}{d} = e$

Application Problems

1. The perimeter of a rectangle is $2L + 2W = P$. Write a formula for length, L , in terms of P and W . Use the formula you created to determine the value of L when $P = 20$ and $W = 4$.

2. In physics, the following formula relates your distance above the ground, d , relative to how long, t , an object has been in the air:

$$d = vt + \frac{1}{2}at^2$$

(a) Solve the formula for a , the acceleration due to gravity

(b) Using your manipulated equation, find the value of a if $d = 80$, $v = 50$, and $t = 8$. *Note: an acceleration towards the ground is negative

3. The conversion between Fahrenheit and Celsius is shown as follows:

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

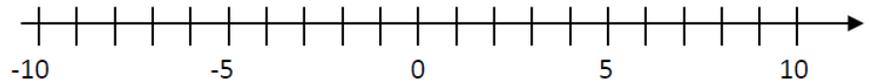
(a) Using the formula above, convert 50°F to Celsius.

(b) This conversion formula is very useful if you are given Fahrenheit, but less useful if you know a Celsius temperature. Solve the above formula for Fahrenheit, F , and then convert 50°C into Fahrenheit.

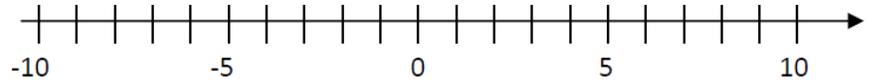
Solving Basic Inequalities

1. Solve the inequality using the properties of inequality and graph the final solution set on the number line provided.

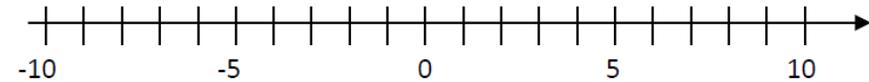
(a) $5x - 6 \leq 24$



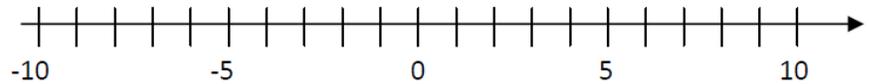
(b) $2(5 - x) \leq 12$



(c) $6 - 4x > 18$



(d) $8x - 6(x - 2) > 20 - 2x$



Creating and Solving Basic Inequalities

1. Two siblings Edwin and Rhea are both going skiing but choose different payment plans. Edwin's plan charges \$45 for rentals and \$5.25 per lift up the mountain. Rhea's plan was a bundle where her entire day cost \$108.

(a) Set up an inequality that models the number of trips, n , up the mountain for which Edwin will pay more than Rhea. Solve the inequality.

(b) What is the greatest amount of trips that Edwin can take up the mountain and still pay less than Rhea? Explain how you arrived at your answer.

2. A school is taking a field trip with 195 students and 10 adults. Each bus can hold at most 40 people. Let n be the number of busses taken on the trip. Write and solve an inequality that models this problem based on n .
3. Find all numbers for which five less than half the number is at least seven. Set up an inequality that can be used to answer this question and solve the inequality.
4. When 4 times a number n is decreased by 3, it is at most 21. Create an inequality that can be used to solve this problem and solve the inequality

Literal Inequalities

1. Given a , b , c , and d are all positive, solve the following inequalities for x .

(a) $ax + b \geq cd$

(b) $\frac{a(x+2)}{b} > c$

2. Given that $ax + b > d$ and $a < 0$, solve for x in terms of a , b , and d .

$$x \leq 6, x \geq -1, x < -3, x > 2, 5.25n + 45 > 108 \mid n > 12 \mid 11 \text{ trips}, 40n \geq 205 \mid 6 \text{ busses}, x \geq \frac{cd-b}{a}, x > \frac{bc}{a} - 2, x < \frac{d-b}{a}, \frac{1}{2}n - 5 \geq 7 \mid n \geq 24, 4n - 3 \leq 21 \mid n \leq 6$$