Curriculum Outcome

PR1: . Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.

PR3. Model and solve problems using linear equations of the form:

$ax = b;$ = b , $a ≠ 0$; $ax + b = c$; +b = c, $a ≠ 0$; = b, $x ≠ 0$ ax ax xa

$ax+ b = cx + d$; $a(bx + c) = d(ex + f)$; $a(x + b) = c$; $ax = b+cx$

concretely, pictorially and symbolically, where $a, b, c, d, e, and f$ are   rational numbers

Student Friendly: Replacing the equal sign with an inequality sign (ie. <, >)
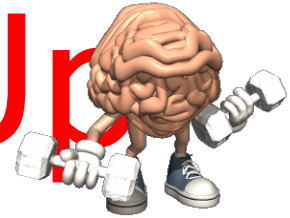
Warm-Up

1) $\dfrac{1}{3}(15 + 3r) = \dfrac{2}{5}(15 - 5r)$

2) $3u + 6 - 5u = 17 + 4u - 6$

3) $\dfrac{2}{3}(5 + 2r) = 4 - r$

Warm-Up

1) $\dfrac{1}{3}(15 + 3r) = \dfrac{2}{5}(15 - 5r)$

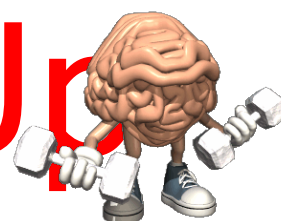$$\dfrac{15}{3} + \dfrac{3r}{3} = \dfrac{30}{5} - \dfrac{10r}{5}$$

$$5 + r \quad^{+2r} = 6 \quad -2r$$

$$5 + 3r = 6^{-5}$$

$$\dfrac{3r}{3} = \dfrac{1}{3}$$

$$\boxed{r = \dfrac{1}{3}}$$

Warm-Up

2) $3u + 6 - 5u = 17 + 4u - 6$

$$-2u + 6 = 11 + 4u $$

$$6^{-11} = 11^{+1} + 6u$$

$$\frac{-5}{6} = \frac{6u}{6}$$

$$u = \frac{-5}{6}$$

$u = \dfrac{-5}{6}$

Warm-Up

3) $\dfrac{2}{3}(5 + 2r) = 4 - r$

$r = \dfrac{2}{7}$

$\dfrac{10}{3}^{(3)} + \dfrac{4r}{3}^{(3)} = 4^{(3)} - r^{(3)}$

$10 + 4r^{+3} = 12 - 3r^{+3r}$

$10^{-10} + 7r = 12^{-10}$

$\dfrac{7r}{7} = \dfrac{2}{7}$

$r = \dfrac{2}{7}$
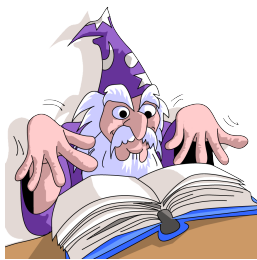
Section 6.3

Introduction to Linear Inequalities

Tallest man
7 feet 9 inches
or 2.36m tall
$>$
Smallest man
29 inches
or 0.74m tall

What is an inequality?

We use inequalities to model situations
that can be described by a
range of numbers instead of a single number.

"Pick a number greater than 7."

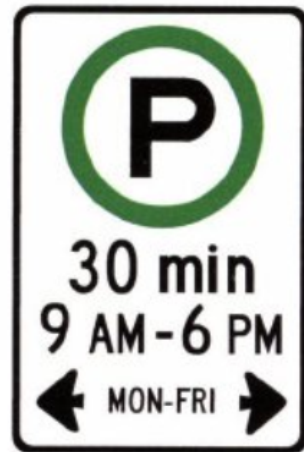# When one quantity is....

less than $<$

greater than $>$

less than or equal to $\leq$

greater than or equal to $\geq$
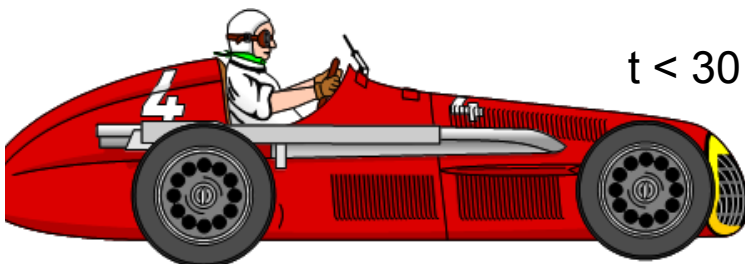
Which of these inequalities describes the time,
t minutes, for which a car could be legally parked?

t > 30   t ≥ 30

t < 30   t ≤ 30

$$5 \quad < \quad 8$$

$$x \geq 7$$

Define a variable and write an inequality for each of the following situation:

Variable: *s,* speed

Inequality: $s \le 55$

Variable: *t,* temperature

Inequality: $t < 4$

Variable: *h,* height

Inequality: $h \ge 102$

Variable: *a*, age

Inequality: $a \ge 14$

CAPTAIN ANSWER

Determining whether a number is a solution to an inequality

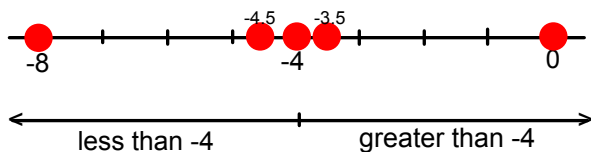Is each number a solution of the inequality $b \geq -4$?

-8   -3.5   -4   -4.5   0

We can do this in TWO different ways:

Method 1: Using a Number Line

Show all numbers on a line.

The solution of $b \geq -4$ is all numbers that are greater than (to the right) or equal to -4.

-8   -4.5   -3.5   0

-4

← less than -4   greater than -4 →

For a number to be greater than -4, it must lie to the right of -4.

a) -8 is to the left of -4, so -8 is **not** a solution
b) -3.5 is to the right of -4 so -3.5 **is** a solution
c) -4 is equal to itself, so it **is** a solution
d) -4.5 is to the left of -4, so -4.5 is **not** a solution
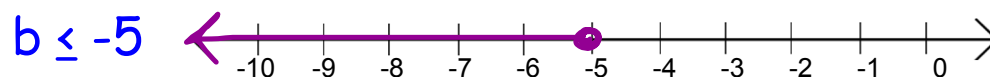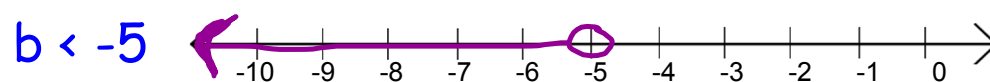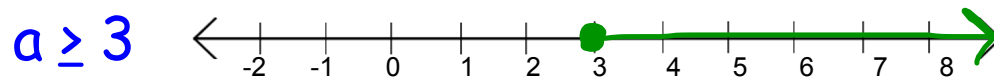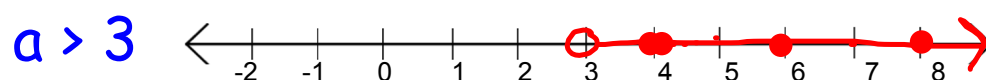e) 0 is to the right of -4, so 0 **is** a solution

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Method 2: Use Substitution.

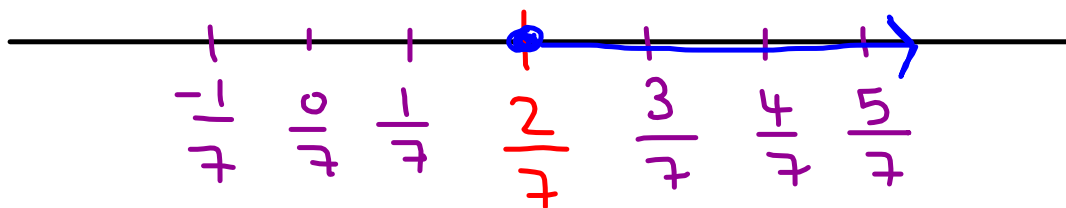Substitute each number for *b* in the inequality $b \geq -4$.

Determine whether the resulting inequality is true or false.

a) Since $-8 \geq -4$ is false, -8 is not a solution.
b) Since $-3.5 \geq -4$ is true, -3.5 is a solution.
c) Since $-4 = -4$, -4 is a solution.
d) Since $-4.5 \geq -4$ is false, -4.5 is not a solution.
e) Since $0 \geq -4$ is ture, 0 is a solution.

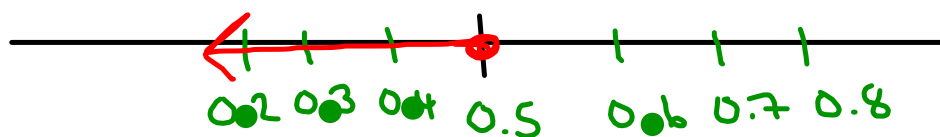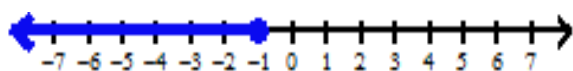# Graphing inequalities

$a > 3$

$a \geq 3$

$b < -5$

$b \leq -5$

$$b \geq \frac{2}{7}$$

$$-\frac{1}{7} \quad \frac{0}{7} \quad \frac{1}{7} \quad \frac{2}{7} \quad \frac{3}{7} \quad \frac{4}{7} \quad \frac{5}{7}$$

$$b \leq 0.5$$
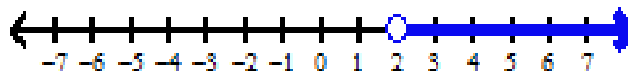

0.2　0.3　0.4　0.5　　0.6　0.7　0.8

Write the inequality given by the following graph.

1)

2)

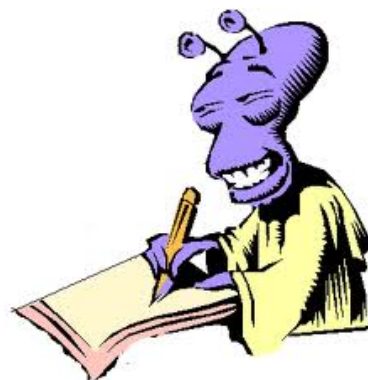$$n \leq -1$$

$$x > 2$$

Graphing inequalities

-2 < p < 3

P < 3

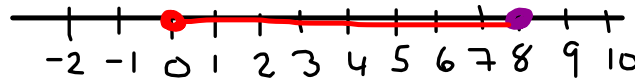P > -2

(number line from -3 to 4, open circle at -2 and open circle at 3, shaded between)

0 ≤ a ≤ 8

a ≥ 0

a ≤ 8

(number line from -2 to 10, closed circle at 0 and closed circle at 8, shaded between)

-5 < t ≤ -2

(number line from -6 to 0, open circle at -5 and closed circle at -2, shaded between)

-10 ≤ g < -6

(number line from -10 to 0)

$$-6 < t$$

$$\boxed{t > -6}$$

A number line marked from -9 to -3 with an open circle at -6 and an arrow extending to the right.

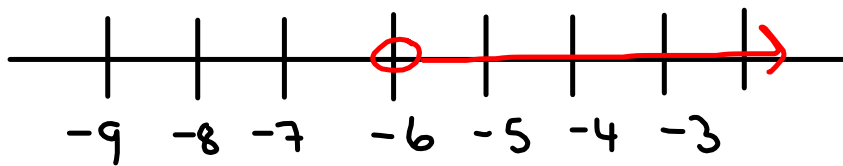$-9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3$
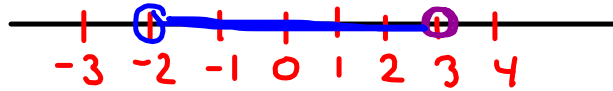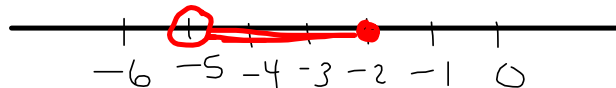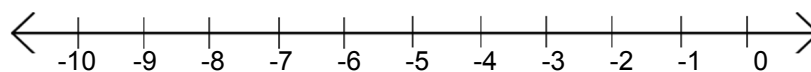
Class/Homework

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Questions: 3(aceg), 4, 7(ac) ,8,9,
12,13(aceg)