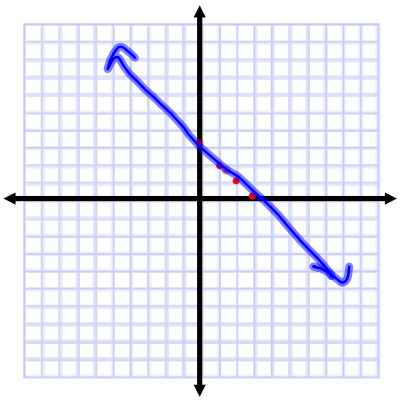
November 27, 2013

Algebra 4-8: The Triangle Inequality

Warm-Up

1. Graph the equation x + y = 3

x	y
2	1
1	2
3	0
0	3
1.5	1.5



2. An angle is 54.

   a. Find the measure of the angle's supplement. 126° 180-54

   b. Find the measure of the angle's complement. 36° 90 - 54

3. Simplify. 4a – (2a + 1)

4a + -2a + -1

2a + -1

In order to form a triangle, the sum of the 2 shortest sides must be greater than the third side.

2 Methods--Finding Possible side-lengths of a triangle

3, 4, x

Method 1	Method 2 - Shortcut
x is the longest side: $3+4>x$, $7>x$	$1 < x < 7$
x is one of the shorter sides: $x, 3, 4$ $x+3>4$, $x>1$	↖ possible side lengths

When finding the possible lengths, write the answer as a compound inequality.

For Example: $1<x<7$

Examples

For numbers 1 – 5, determine if the following are possible measurements for the sides of a triangle? Why or why not?

1. 1, 3, & 4 — $1+3>4$, $4>4$ NO

2. 3, 3, & 5 — $3+3>5$, $6>5$ yes
3. 4, 6, & 9 — $4+6>9$, $10>9$ yes
4. 1, 1, & 2 — $1+1>2$, $2>2$ NO
5. 6, 10, & 15 — $6+10>15$, $16>15$ yes

For number 6 – 8, the lengths of 2 sides of a triangle are given. Find the possible lengths for the 3rd side.

6. 4, 8 & x $4 < x < 12$

7. 12, 15, & x $3 < x < 27$

8. 20, 30, & x $10 < x < 50$

4, 8, x or x, 4, 8
4 + 8 > x
12 > x
x + 4 > 8
x > 4

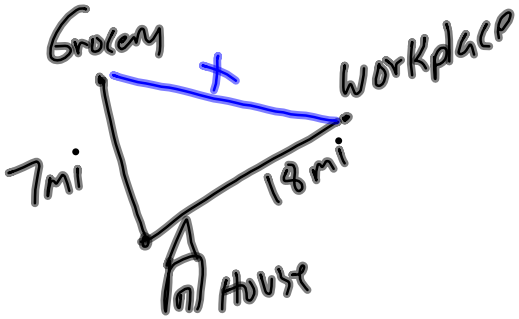
12, 15, x or x, 12, 15
12 + 15 > x
27 > x
x + 12 > 15
x > 3

20, 30, x or x, 20, 30
20 + 30 > x
50 > x
x + 20 > 30
x > 10

9. The grocery store is 7 miles from your house. Your workplace is 18 miles from your house. What are the possibilities for the distance between the grocery store and your workplace?

$11 < x < 25$ miles

Diagram:



$7 + 18 > x$

$25 > x$

$x + 7 > 18$

$-7 \quad -7$

$x > 11$