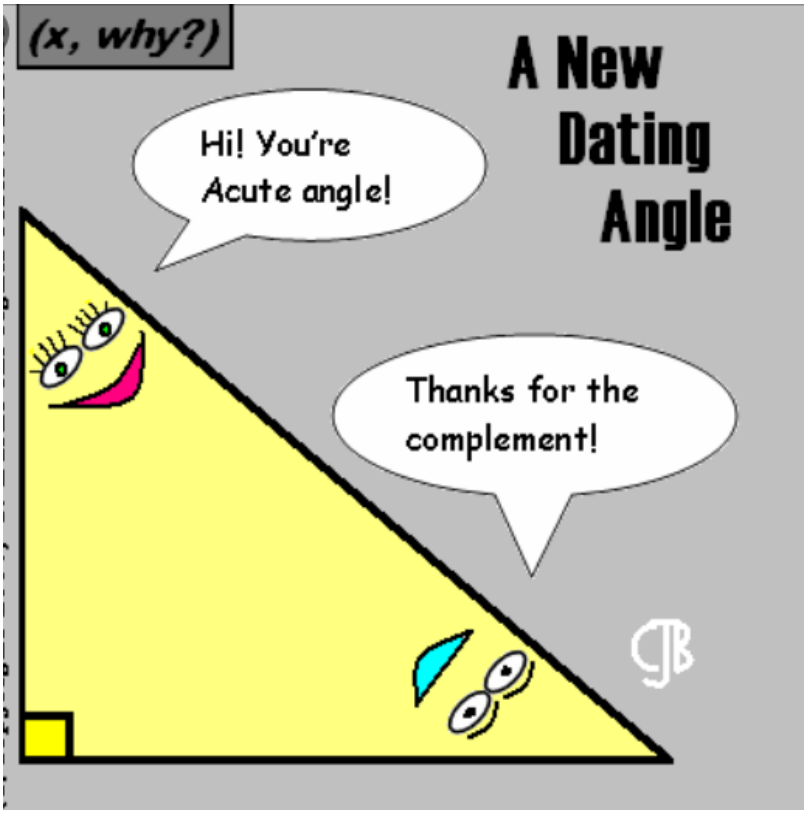
Rules for Class Sessions

1. You must use your first AND last name as a participant.

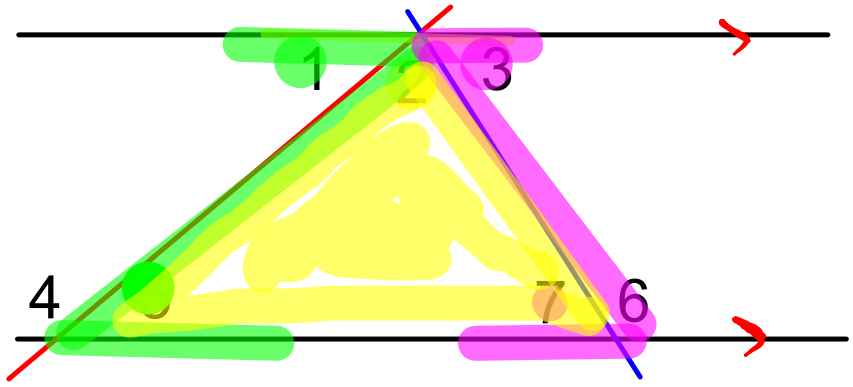
2. Once logged in, type "here" in the chat for attendance.

3. Raise your hand for a question.

4. Respect others.


(x, why?)
A New Dating Angle
Hi! You're Acute angle!
Thanks for the complement!

Alt. ∠s



$m\angle 1 + m\angle 2 + m\angle 3 = 180$

$m\angle 5 + m\angle 2 + m\angle 7 = 180$

All About Triangles

1. Triangle Sum Theorem:

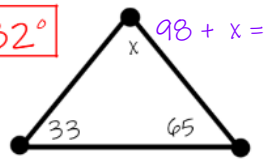
The sum of the three **interior** angles of a triangle is 180° .

Examples: Find the missing angle in each triangle below.

a. $33 + 65 + x = 180$

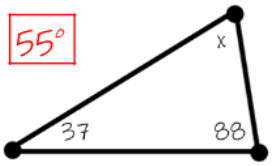
$98 + x = 180$

82°



b. $37 + 88 + x = 180$

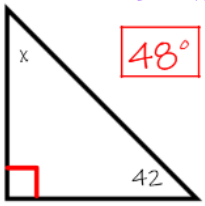
55°



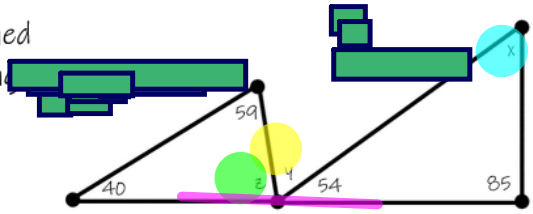
c. $x + 42 + 90 = 180$

$x + 42 = 90$

48°



2. **Challenge:** Use the properties we have learned about angle relationships to find the missing angles in the diagrams.



$40 + 59 + z = 180$

$99 + z = 180$

$z + y + 54 = 180$

$81 + y + 54 = 180$

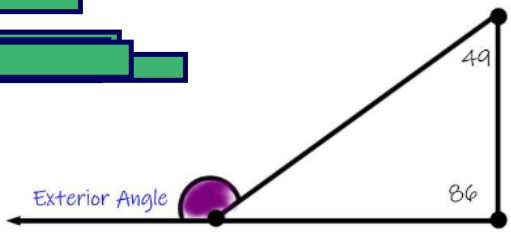
$54 + 85 + x = 180$

$139 + x = 180$

x = 41

y = 45 z = 81

3. **The Exterior angle Theorem:** If you extend the side lengths of a triangle beyond its vertices, exterior angles are created.



- The sum of the two non-adjacent angles in the triangle will be equal to the exterior angle.

$49 + 86 = Exterior$

$135 = Exterior$

The non-adjacent angles are called the remote angles.

uation: remote angle + remote angle = exterior angle

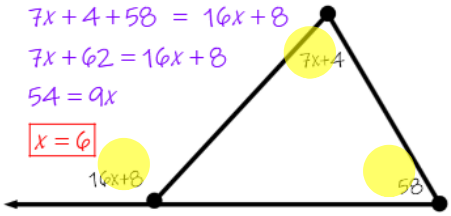
Examples: Solve for x.

a. $7x + 4 + 58 = 16x + 8$

$7x + 62 = 16x + 8$

$54 = 9x$

$x = 6$



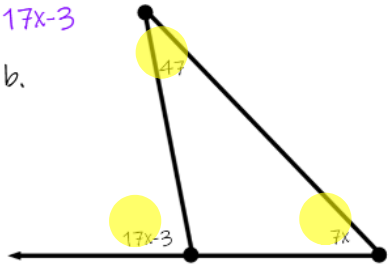
x = 6

$7x + 47 = 17x - 3$

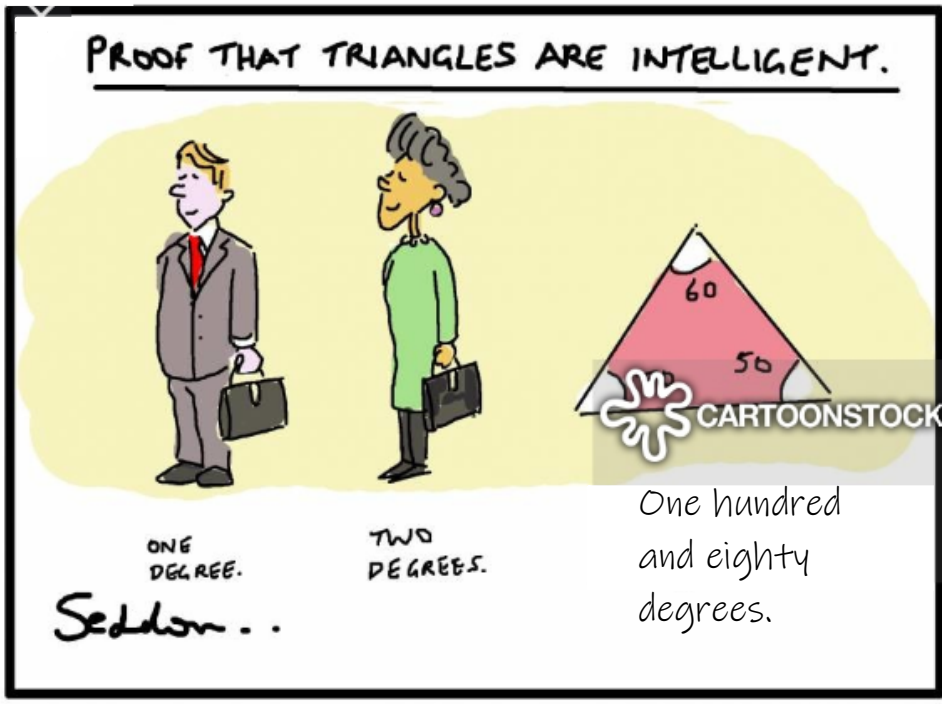
$50 = 10x$

$x = 5$

b.

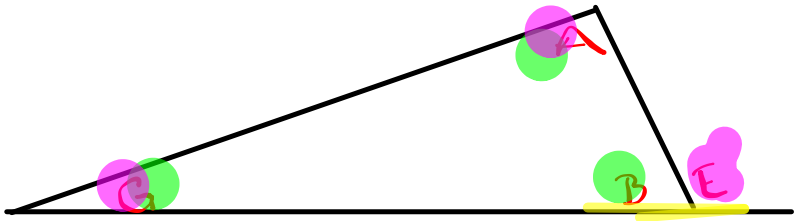


x = 5


PROOF THAT TRIANGLES ARE INTELLIGENT.
ONE DEGREE.
TWO DEGREES.
Seldom . .
60
50
CARTOONSTOCK
One hundred and eighty degrees.

$m\angle B + m\angle E = 180$

$m\angle G + m\angle A + m\angle B = 180$



$m\angle B + m\angle E = m\angle G + m\angle A + m\angle B$

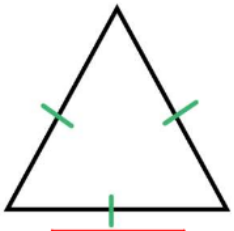
$-m\angle B \quad\quad -m\angle B$

$m\angle E = m\angle G + m\angle A$

4. Classifying Triangles

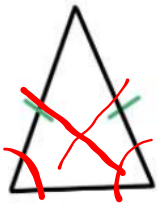
By their Sides:

a. Three Congruent sides:



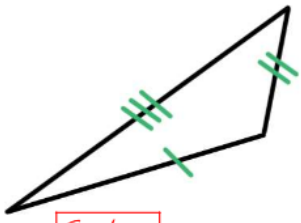
Equilateral

b. Two Congruent Sides



Isosceles

c. No Congruent Sides



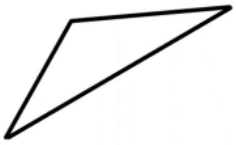
Scalene

By their angles

d. All Acute angles

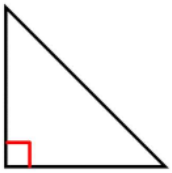
Acute Triangle

e. One obtuse angle



Obtuse Triangle

f. One right angle



Right

5. An Equilateral triangle will also be Equiangular meaning that all three angles will be congruent too.

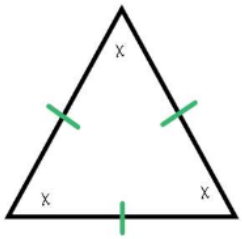
- If all angles add be 180, and they are all the same...what would the measure of each angle have to be?

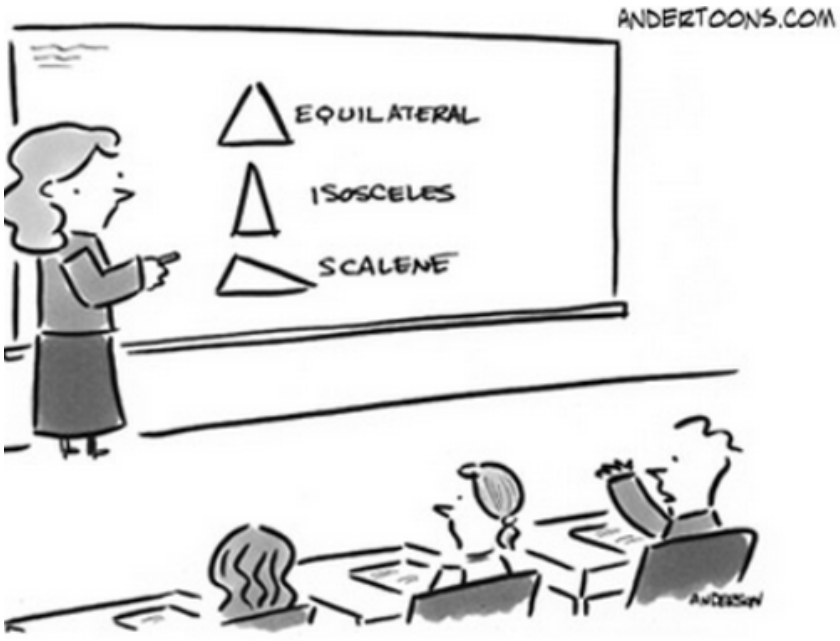
  $x + x + x = 180$

  $3x = 180$

  $x = 60$

- This will always be true. Each angle in an equilateral triangle will always be 60 degrees.



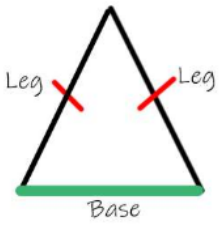


"You forgot Bermuda."

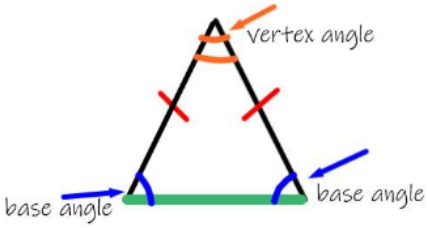
Isoceles Kitteh
has acute nose

6. The Base Angles Theorem

- In an **Isosceles** triangle, the two congruent sides are called the legs of the triangle, and the third side is called the base.



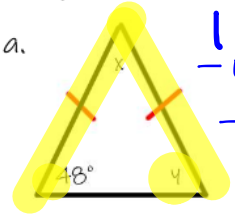
- The two angles on the base are called the base angles and they are always congruent. They are the angles opposite the congruent sides.
- The third angle is called the vertex angle.



- If you know two angles are congruent, that proves the sides opposite the angles are congruent.
- If you know that the sides are congruent, that proves that the angles opposite them are congruent.

Examples: Solve for x and y.

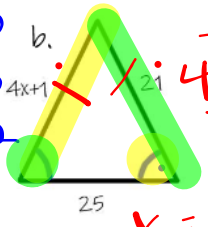
a.



180 − 48 − 48 = 84

x=84 y= 48

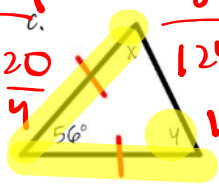
b.



4x+1 = 21
−1 −1
4x = 20
4 4
x = 5

x= 5

c.

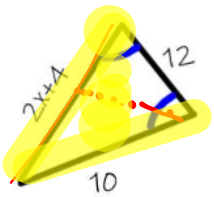


180 − 56 = 124

124/2

x=62 y= 62

d.



2x+4 = 10
−4 −4
2x = 6
2 2
x = 3

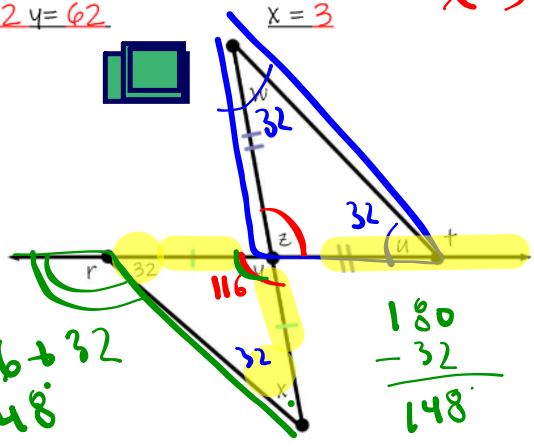
x = 3

e. Challenge Section!

w = 32 x = 32 y = 116

z=116 t =148 u= 32

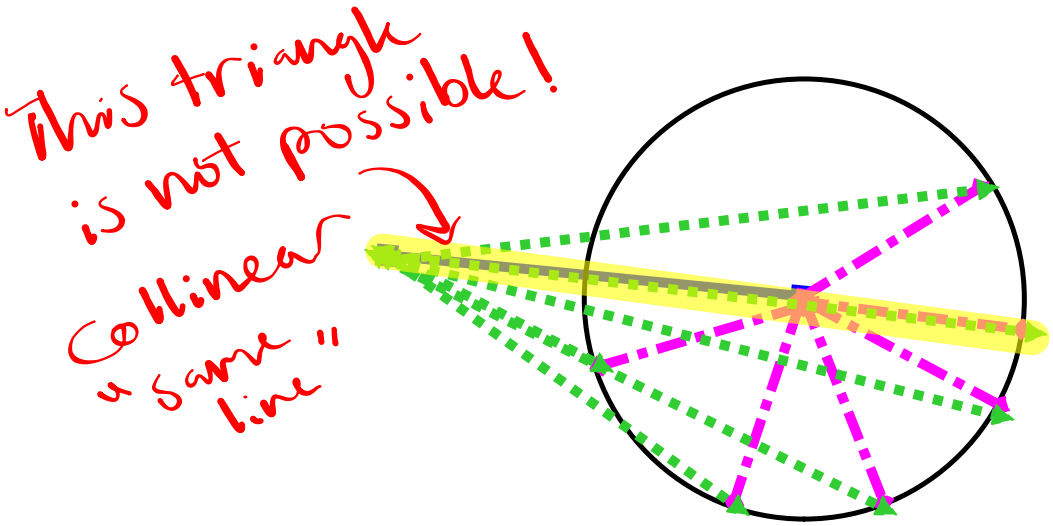
r = 148

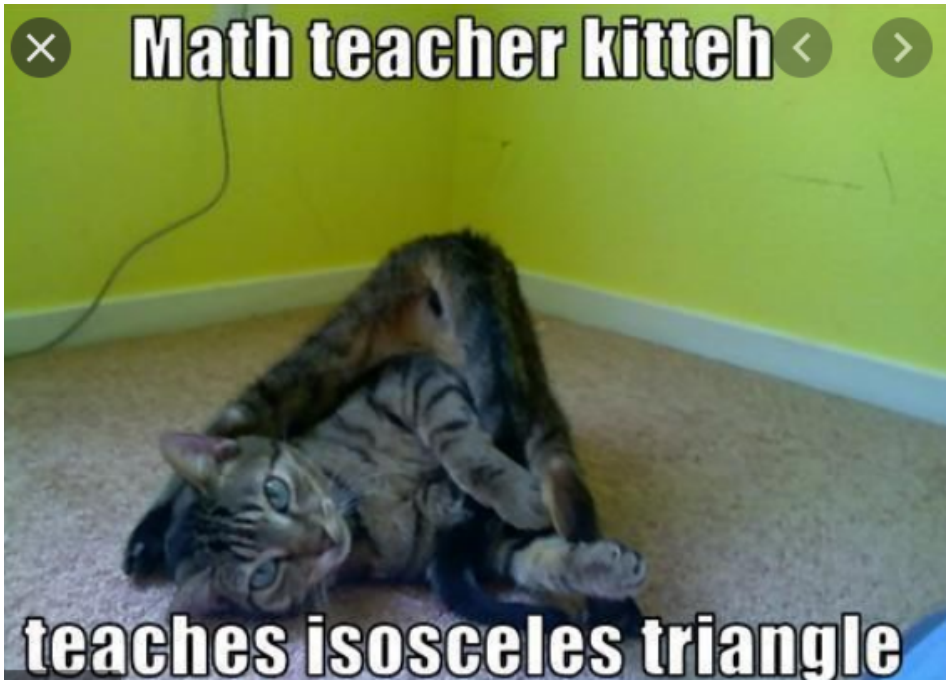


180 − 32 − 32 = 116

r = 116 + 32 = 148

180 − 32 = 148


This triangle is not possible!
Collinear = same line


Math teacher kitteh
teaches isosceles triangle

7. The Triangle inequality Theorem

- The sum of any two sides of a triangle must be greater than the length of the third side.
- The largest angle is opposite of the longest side, and the smallest angle is opposite the shortest side.

State if the Three numbers can be the side lengths of a triangle.

a. 10,7,20 NO! 10 + 7 = 17 17<20	b. 3,6,9 NO! 3+6=9 9 = 9 9 is not greater than 9.	c. 3,4,8 3 + 4 =7; 7>5 3 + 5 =8; 8>4 4 +5 = 9; 9>3 YES!
d. 7,10,3 NO! 7 + 3 =10; 10=10 10 is not greater than 10	e. 12,18,7 12 +18 = 30; 30>7 12 + 7 = 19; 19>18 18 + 7 = 25; 25> 12 YES!	f. 8,15,17 8 + 15 = 23; 23>17 8 + 17 = 25; 25>15 15 + 17 = 32; 32> 8 YES!

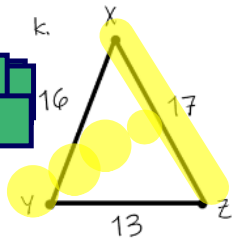
3+4=7
4-3=1
1<x<7

Two sides of a triangle have the following measures. Find the Range of possible measures of the third side.

g. 9,9 9+9=18 9−9=0 0 < x < 18	h. 10,7 10+7=17 10−7=3 3 < x < 17
i. 10,9 10+9=19 10−9=1 1 < x < 19	j. 8,12 12+8=20 12−8=4 4 < x < 20

For each triangle below, if the **sides** are given: state which angle is the largest one, and which angle is the smallest one. IF the **angles** are given, state which side is the longest, and which side is the shortest.

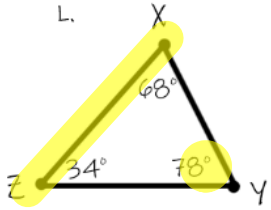
k.



Largest : ∠Y

smallest : ∠X

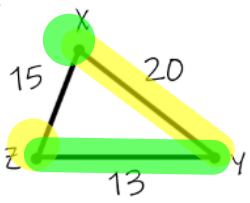
L.



Longest : $\overline{XZ}$

Shortest : $\overline{XY}$

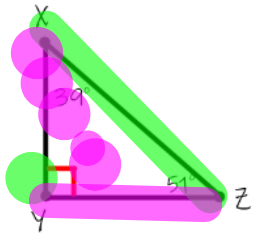
m.



Largest : ∠Z

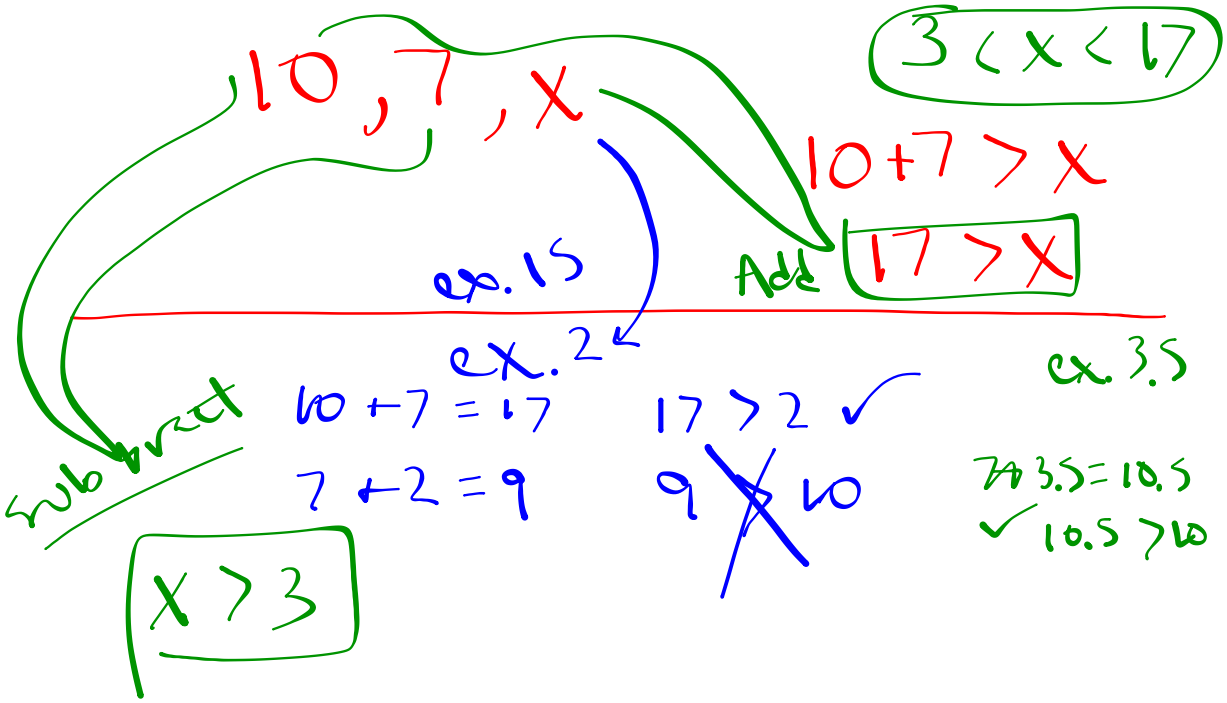
smallest

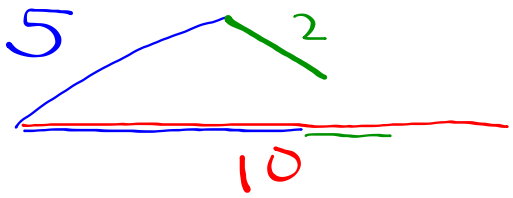
n.



Longest : $\overline{XZ}$

Shortest : $\overline{YZ}$


10, 7, X
3 < X < 17
10+7 > X
17 > X
Add
Subtract
ex. 15
ex. 2
ex. 3.5
10+7=17
7+2=9
17 > 2 ✓
9 ✗ 10
7+3.5=10.5
✓ 10.5 > 10
X > 3

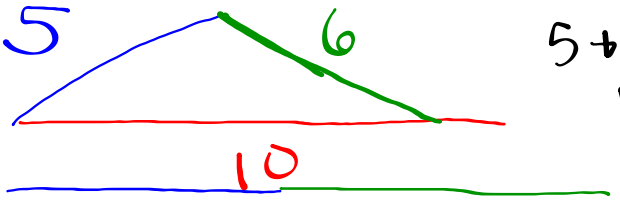


$5+2=7$

$7 < 10$

$5+5=10$

$10=10$



$5+6=11$

$11>10$ ✓