Key

Math 1

Name _____

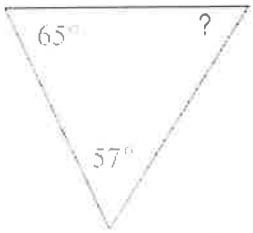
Date _____

6-4 Triangle Properties Notes

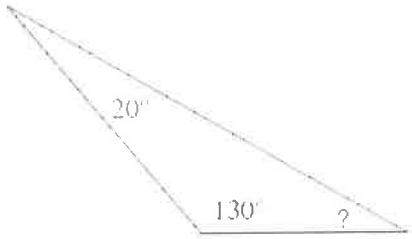
- *I can use theorems, postulates, or definitions to solve problems involving triangles.*

Triangle Sum Theorem: the three interior angles of every triangle sum to 180°.

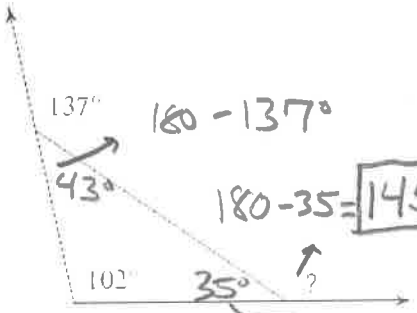
Find the measure of each angle indicated:

1. 

180 − 65 − 57 = 58°
or 180 − (65 + 57)

2. 

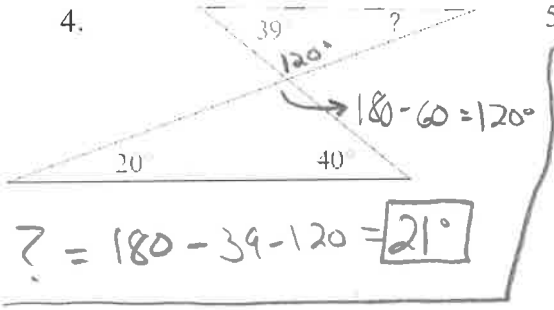
180 − 150 = 30°

3. 

180 − 137°

180 − 35 = 145°

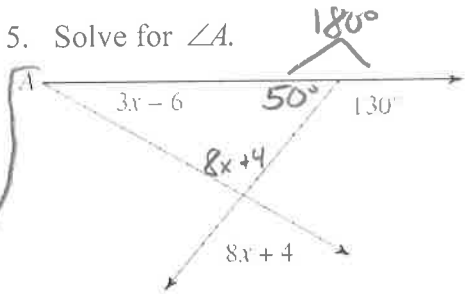
180 − 43 − 102 =

4. 

180 − 60 = 120°

? = 180 − 39 − 120 = 21°

5. Solve for ∠A.



3x − 6 + 8x + 4 + 50 = 180°

11x + 48 = 180

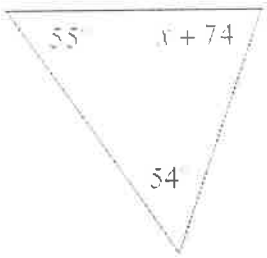
11x = 132

x = 12

m∠A = 3(12) − 6

= 30°

6. Solve for x.



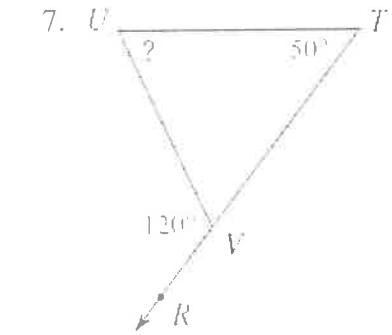
55 + 54 + x + 74 = 180°

x + 183 = 180

x = −3

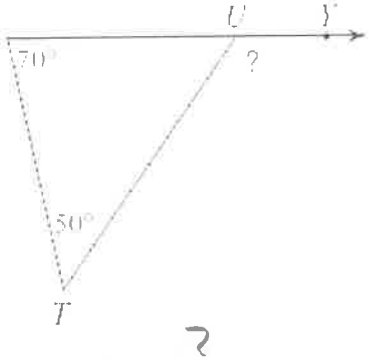
Exterior Angle Theorem: the measure of an exterior angle of a triangle is equal to the sum of the measures of the remote interior angles.

Find the measure of each angle indicated:

7. 

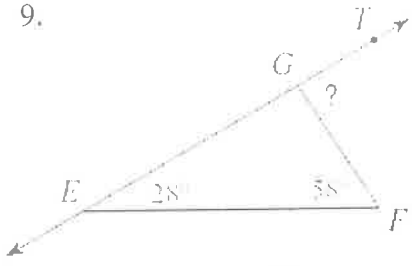
50 + ? = 120

? = 70°

8. 

70 + 50 = ?

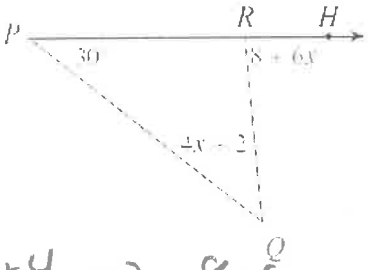
120° = ?

9. 

28° + 58° = ?

86° = ?

10. Find the measure of $\angle Q$.



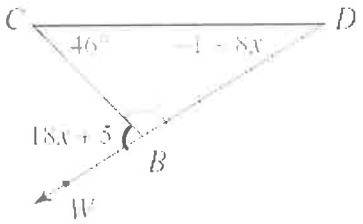
$30 + 4x + 2 = 8 + 6x$

$24 = 2x$

$12 = x$

$m\angle Q = 4(12) + 2 = \boxed{50°}$

11. Find the measure of $\angle CBW$.



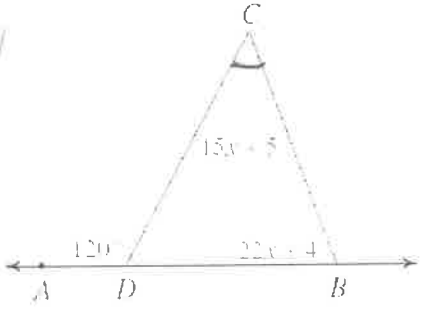
$46 + -1 + 8x = 18x + 5$

$40 = 10x$

$4 = x$

$m\angle CBW = 18(4) + 5 = \boxed{77°}$

12. Find the measure of $\angle C$.



$15x + 5 + 22x + 4 = 120$

$37x + 9 = 120$

$37x = 111$

$x = 3$

$m\angle C = 15(3) + 5$

$= \boxed{50°}$

Triangle Inequality:

Any side of a triangle must be shorter than the sum of the other two sides.

Could a triangle be formed with the following side lengths?

13. 3, 5, 7 — Yes!

14. 20, 48, 25 — No! $48 \not< 25 + 20$

15. 35, 65, 35 — Yes!

16. Two sides of a triangle are given. Find the range of possible measures for the third side.

a. 12 and 17

Between 5 & 29, not including 5 & 29

b. 23 and 35

Between 12 & 58, not inclusive.

Isosceles Triangle Properties:

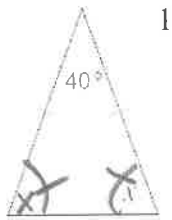
Two congruent sides. Base angles (there are two) are congruent.

Solve for x in the following.

17.

$\boxed{x = 7}$

18.

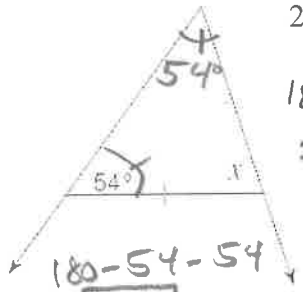


$40 + 2x = 180$

$2x = 140$

$\boxed{x = 70}$

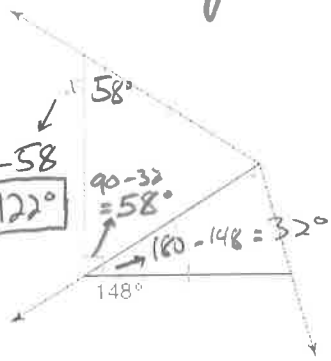
19.



$180 - 54 - 54$

$= \boxed{72°}$

20.

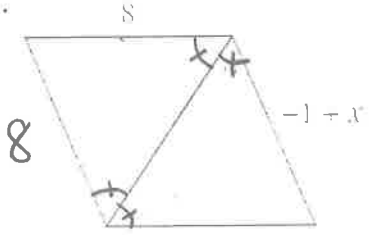


$180 - 58 = \boxed{122°}$

$90 - 32 = 58°$

$180 - 148 = 32°$

21.

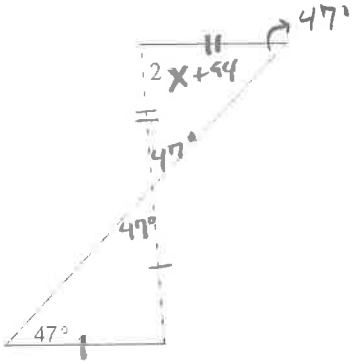


Need to know SAS to do this...

$-1 + x = 8$

$\boxed{x = 9 \text{ units}}$

22. $m\angle 2 = x + 94$

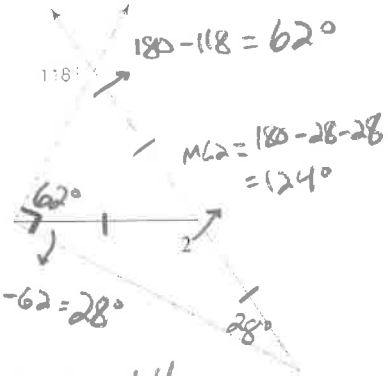


$x + 94 + 47 + 47 = 180$

$x + 188 = 180$

$\boxed{x = -8}$

23. $m\angle 2 = 12x + 4$



$180 - 118 = 62°$

$m\angle 2 = 180 - 28 - 28$

$= 124°$

$90 - 62 = 28°$

$124 = 12x + 4$

$120 = 12x$

$\boxed{x = 10}$