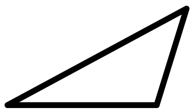
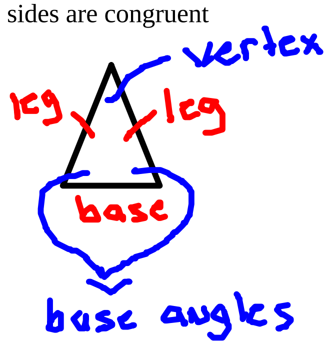
Classifying Triangles

Classifying Triangles By Sides

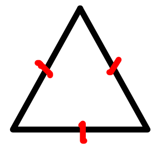
Scalene - No sides are congruent



Isosceles - At least two sides are congruent

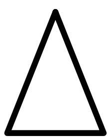


Equilateral - All sides are congruent

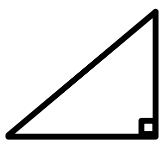


Classifying Triangles By Angles

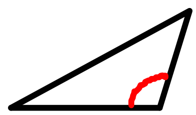
Acute - All angles are acute



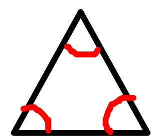
Right - One angle is right



Obtuse - One angle is obtuse

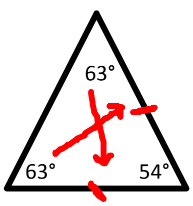


Equiangular - All angles are congruent



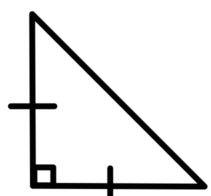
Directions: Classify the triangle by its angles and by its sides.

1.



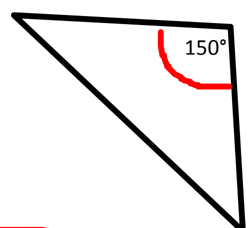
Acute
Isosceles

2.



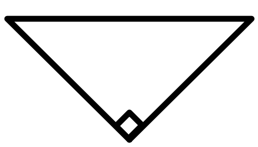
Right
Isosceles

3.



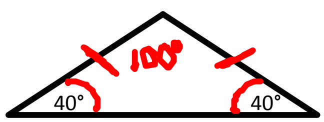
Obtuse
Scalene

4.



Right
Scalene

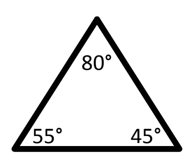
5.



$$\begin{array}{r} 40 \\ +40 \\ \hline 80 \end{array} \qquad \begin{array}{r} 180 \\ -\ 80 \\ \hline 100^\circ \end{array}$$

Obtuse
Isosceles

6.



Acute
Scalene

Directions: Complete the statement using *always*, *sometimes* or *never*.

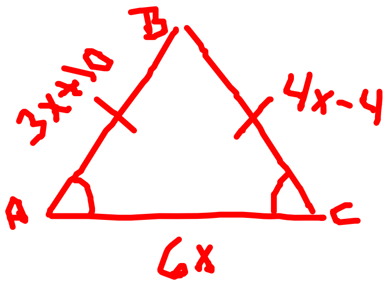
7. An isosceles triangle is sometimes an equilateral triangle.

8. An obtuse triangle is sometimes an isosceles triangle.

9. The acute angles of a right triangle are always complementary.

10. A triangle never has a right angle and an obtuse angle.

11. $\triangle ABC$ is an isosceles triangle and $\measuredangle B$ is the vertex. Find the length of each side if $AB = 3x+10$, $BC = 4x-4$ and $AC = 6x$.



$AB = BC$

$3x+10 = 4x-4$

$-3x \quad -3x$

$10 = x-4$

$+4 \quad +4$

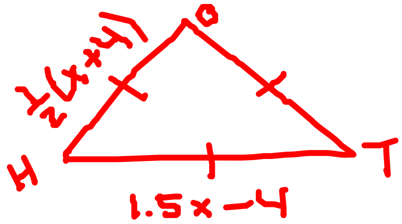
$x = 14$

$AB = 3x+10 = 3(14)+10 = 42+10 = \boxed{52}$

$BC = 4x-4 = 4(14)-4 = 56-4 = \boxed{52}$

$AC = 6x = 6(14) = \boxed{84}$

12. $\triangle HOT$ is an equilateral triangle. Find the length of each side if $HO = \frac{1}{2}(x+4)$ and $HT = 1.5x - 4$.



$HO = HT$

$\frac{1}{2}(x+4) = 1.5x-4$

$\frac{x+4}{2} = \frac{1.5x-4}{1}$

$2(1.5x-4) = x+4$

$3x - 8 = \cancel{x} + 4$

$-x \qquad -\cancel{x}$

$2x - 8 = 4$

$+8 \qquad +8$

$\frac{2x}{2} = \frac{12}{2}$

$x = 6$

$HO = \frac{1}{2}(6+4)$

$= \frac{1}{2}(10)$

$= \boxed{5}$

$HT = 1.5(6) - 4$

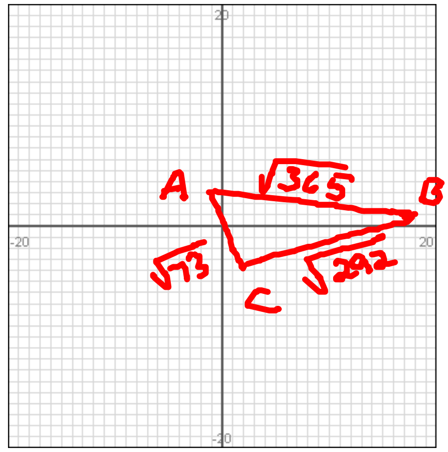
$= 9 - 4$

$= \boxed{5}$

$OT = \boxed{5}$

13. If $A(-1,3)$, $B(18,1)$ and $C(2,-5)$, determine if $\triangle ABC$ is a right triangle.

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$



AB: $A(-1,3)$ $B(18,1)$
$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(18--1)^2 + (1-3)^2}$
$= \sqrt{(19)^2 + (-2)^2}$
$= \sqrt{361+4}$
$= \sqrt{365}$

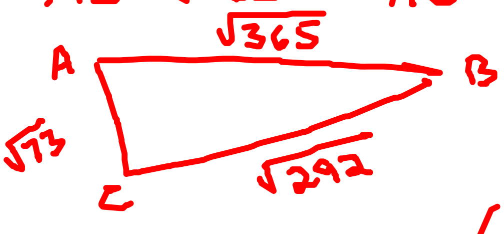
AC: $A(-1,3)$ $C(2,-5)$
$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(2--1)^2 + (-5-3)^2}$
$= \sqrt{(3)^2 + (-8)^2}$
$= \sqrt{9+64}$
$= \sqrt{73}$

BC: $B(18,1)$ $C(2,-5)$
$x_1\ y_1 \quad x_2\ y_2$

$d = \sqrt{(-5-1)^2 + (2-18)^2}$
$= \sqrt{(-6)^2 + (-16)^2}$
$= \sqrt{36+256}$
$= \sqrt{292}$

$AB = \sqrt{365}$ $\quad AC = \sqrt{73}$ $\quad BC = \sqrt{292}$



$a^2 + b^2 = c^2$

$(\sqrt{292})^2 + (\sqrt{73})^2 = (\sqrt{365})^2$

$292 + 73 = 365$

$365 = 365$ ✓

$\boxed{\triangle ABC \text{ is a right } \triangle}$