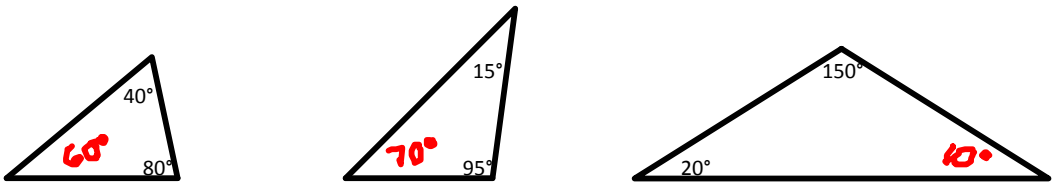
Angles of Triangles

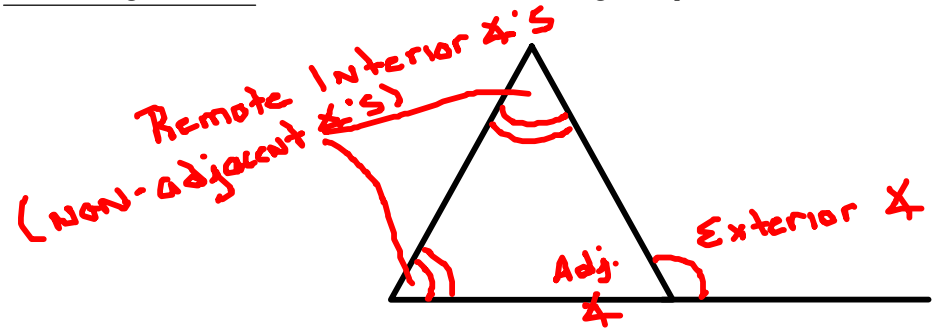
Triangle Sum Theorem - The sum of the measures of the interior angles of a triangle is 180°.



Corollary 1 - The acute triangles of a right triangle are complementary.

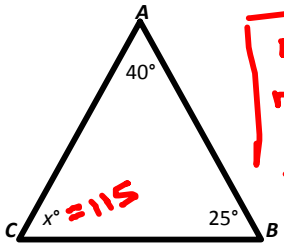
Corollary 2 - There can be at most one right or obtuse angle in a triangle.

Exterior Angle Theorem - The measure of the exterior angle is equal to the sum of the two remote interior angles.



Directions: Find the value of x and the measure of each angle of $\triangle ABC$.

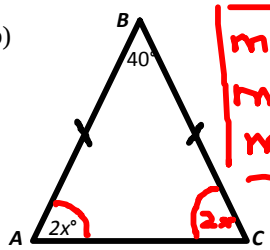
a)



$m\angle A = 40°$
$m\angle B = 25°$
$m\angle C = 115°$

$40 + 25 + x = 180$
$65 + x = 180$
$-65 \quad -65$
$x = 115$

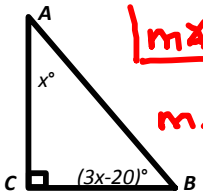
b)



$m\angle A = 70°$
$m\angle B = 40°$
$m\angle C = 70°$

$2x + 2x + 40 = 180$
$4x + 40 = 180$
$-40 \quad -40$
$\frac{4x}{4} = \frac{140}{4}$
$x = 35$

c)



$m\angle A = 27.5°$

$m\angle B = 3(27.5) - 20$
$= 82.5 - 20$
$= 62.5$

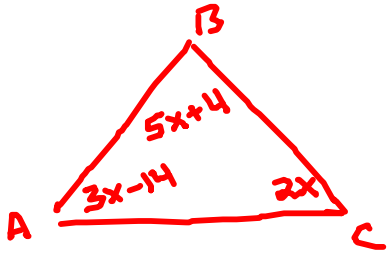
$m\angle C = 90°$

$x + 3x - 20 + 90 = 180$
$4x + 70 = 180$
$-70 \quad -70$
$\frac{4x}{4} = \frac{110}{4}$
$x = 27.5$

d) $m\measuredangle A = 3x - 14$

$m\measuredangle B = 5x + 4$

$m\measuredangle C = 2x$



$3x - 14 + 5x + 4 + 2x = 180$

$10x - \cancel{10} = 180$

$+10 \quad +10$

$\frac{10x}{10} = \frac{190}{10}$

$\boxed{x = 19}$

$m\measuredangle A = 3(19) - 14$

$= 57 - 14$

$\boxed{m\measuredangle A = 43°}$

$m\measuredangle B = 5(19) + 4$

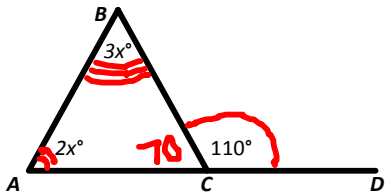
$= 95 + 4$

$\boxed{m\measuredangle B = 99°}$

$m\measuredangle C = 2(19)$

$\boxed{m\measuredangle C = 38°}$

e)



$2x + 3x = 110$

$\frac{5x}{5} = \frac{110}{5}$

$\boxed{x = 22}$

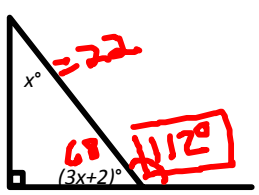
$m\measuredangle A = 2(22) = \boxed{44°}$

$m\measuredangle B = 3(22) = \boxed{66°}$

$m\measuredangle ACB = \boxed{70°}$

Directions: Find the value of x and the measure of the exterior angle.

a)



$x + 3x + 2 = 90$

$4x + 2 = 90$

$-2 \quad -2$

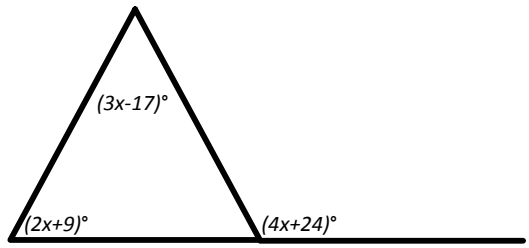
$\frac{4x}{4} = \frac{88}{4}$

$\boxed{x = 22}$

$3(22) + 2 = 66 + 2 = 68$

$180 - 68 = \boxed{112°}$

b)



Ext. ∡

$4x+24$

$4(10)+24=40+24$

$=\boxed{64°}$

$4x+2=3x-17+2x+9$

$\cancel{4x}+2=5x-8$

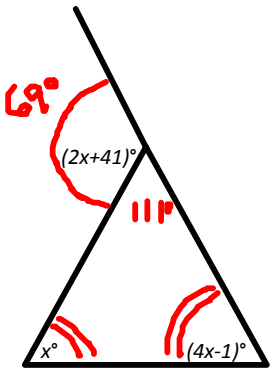
$-\cancel{4x}\qquad -4x$

$2=x-8$

$+8\qquad +8$

$\boxed{x=10}$

c)



$14°$

$4(14)-1$

$56-1$

$55°$

$2x+41=x+4x-1$

$\cancel{2x}+41=5x-1$

$-\cancel{2x}\qquad -2x$

$41=3x-1$

$+1\qquad +1$

$\frac{42}{3}=\frac{3x}{3}$

$\boxed{x=14}$

Ext. ∡

$2x+41$

$2(14)+41$

$28+41$

$\boxed{69°}$