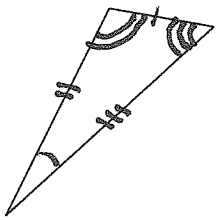
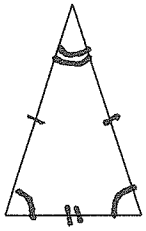
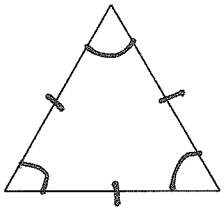
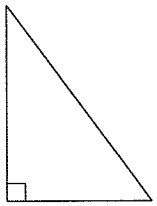
Triangles

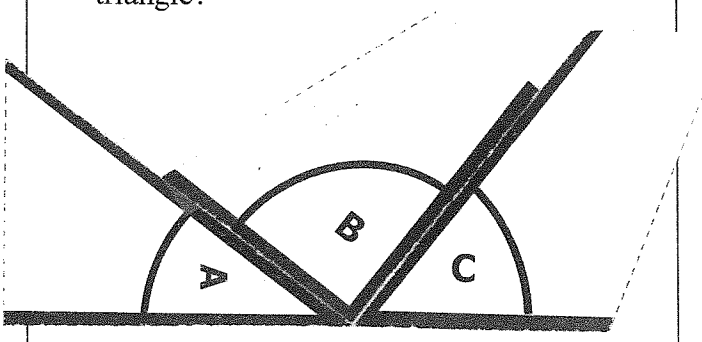
Types of Triangles

			
Scalene	Isosceles	Equilateral	Right-Angled
Characteristics: • No equal sides • No equal angles	Characteristics: • 2 equal sides • 2 equal angles	Characteristics: • 3 equal sides • 3 equal angles	Characteristics: • Has a 90° angle

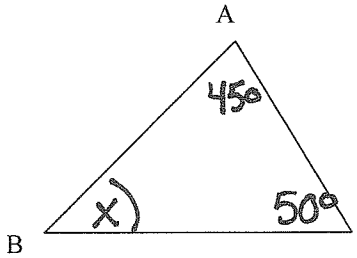
Sum of the Angles in a Triangle Theorem (SATT)

Investigation

- Cut the triangle into three pieces along the dotted lines.
- Line the angles up so they are all pointing in towards each other (black corners touching).
- Tape them to your page in the space provided below.
- What do you notice about the angles in a triangle?



Angles in a triangle add to 180°



<ACB = 50° ✓

<CAB = 45°

<ABC = 85°

$x + 45 + 50 = 180$

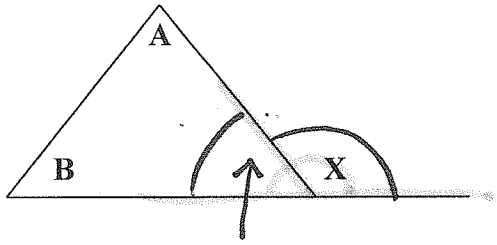
$x + 95 = 180$

$x = 85°$

Exterior Angle Theorem (EAT)

← outside of the Δ.

Mathematical Proof



180-A-B
(SATT)

$X + 180-A-B = 180$

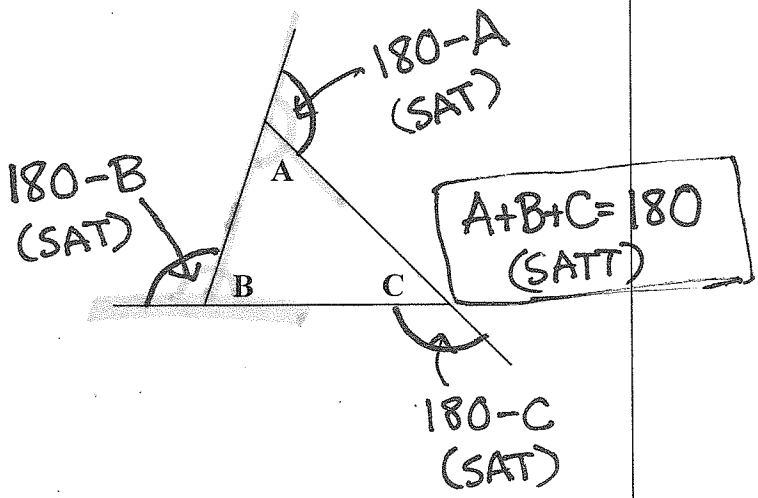
angle 1 angle 2

$X-A-B=0$

$\boxed{X = A+B}$

Sum of Exterior Angles Theorem (SEAT)

Mathematical Proof



$Sum = 180-A+180-B+180-C$

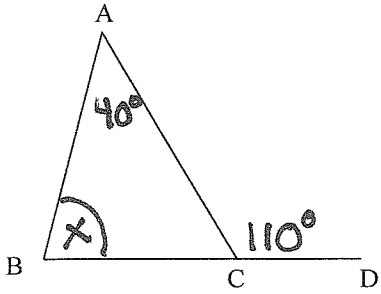
$= 540-A-B-C$

$= 540 - 180$

$= 360°$

Exterior angles are equal to the sum of the two

interior angles



$\angle BAC = 40°$

$\angle ACD = 110°$

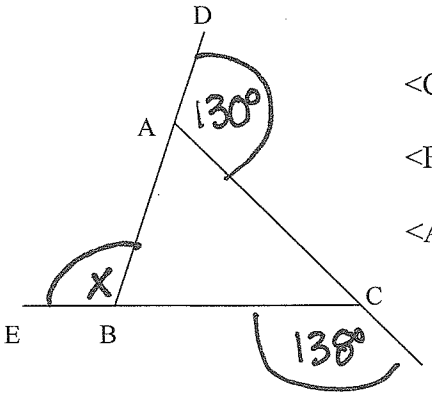
$\angle ABC =$ 70°

$X+40=110$

$X=70°$

The sum of the exterior angles of a triangle is

360°



$\angle CAD = 130°$ ✓

$\angle FCB = 138°$ ✓

$\angle ABE =$ ~~92~~ 92°

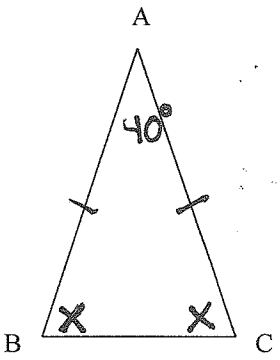
$X+130+138=360$

$X+268=360$

$X=92°$

Isosceles Triangle Theorem (ITT)

Two of the angles in an isosceles triangle are **equal**



$\angle BAC = 40°$

$\angle ACB = 70°$

$\angle ABC = 70°$

$X+X+40=180$

$2X+40=180$

$-40 \quad -40$

$2X=140$

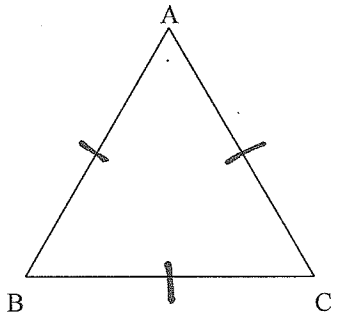
$\frac{2X}{2}=\frac{140}{2}$

$X=70°$

Equilateral Triangle Theorem (ETT)

All angles in an equilateral triangle are $60°$

$\frac{180}{3}$



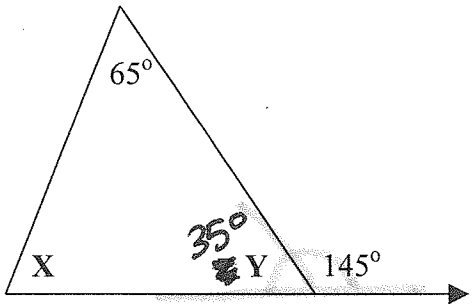
$\angle BAC = 60°$

$\angle ACB = 60°$

$\angle ABC = 60°$

Practice

a)



$Y+145=180$ $-145 \quad -145$

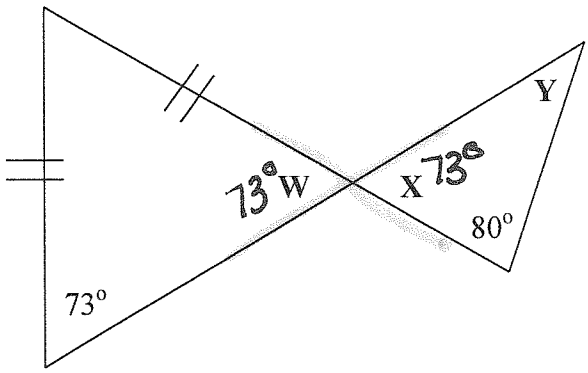
$Y=35°$ (SAT)

$X+65+35=180$

$X+100=180$ $-100 \quad -100$

$X=80°$ (SATT)

b)



$W=73°$ (ITT)

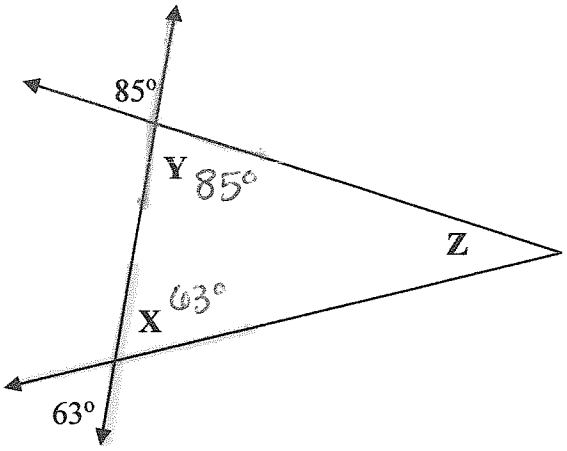
$X=73°$ (OAT)

$Y+73+80=180$

$Y+153=180$ $-153 \quad -153$

$Y=27°$ (SATT)

c)



$X = 63°$ (OAT)

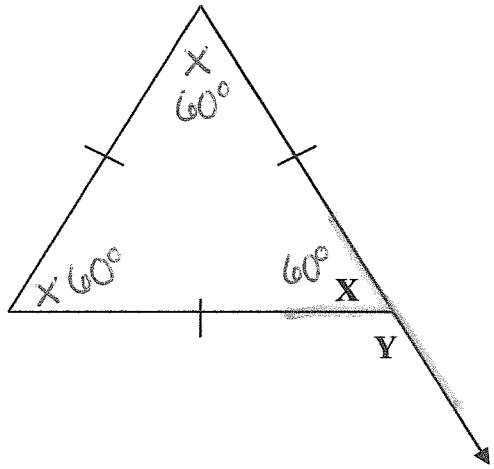
$Y = 85°$ (OAT)

$Z + 85 + 63 = 180$ (SATT)

$Z + 148 = 180$

$Z = 32°$

d)

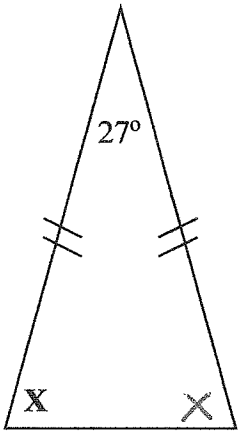


$X = 60°$ (ETT)

$Y + 60 = 180$ (SAT)

$Y = 120°$

e)



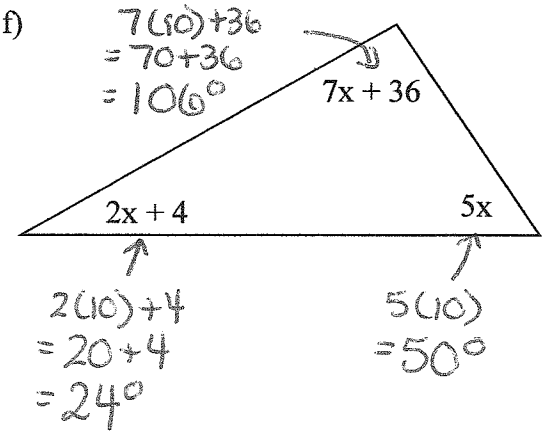
$X + X + 27 = 180$ (ITT, SATT)

$2X + 27 = 180$

$2X = 153$

$X = 76.5°$

f)



$7x + 36 + 5x + 2x + 4 = 180$ (SATT)

$14x + 40 = 180$

$14x = 140$

$x = 10°$