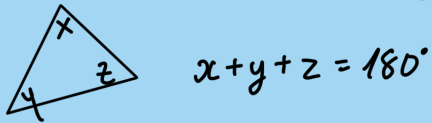
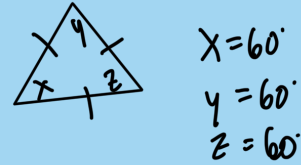


Triangle Theorems

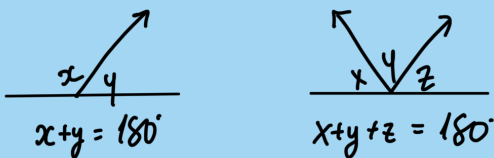
SATT - Sum of Angles in a Triangle Theorem



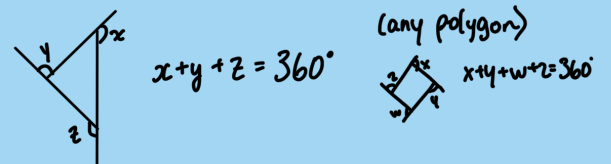
ETT - Exterior Angle Theorem



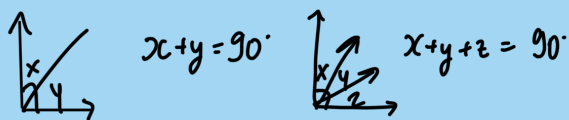
SAT - Supplementary Angle Theorem



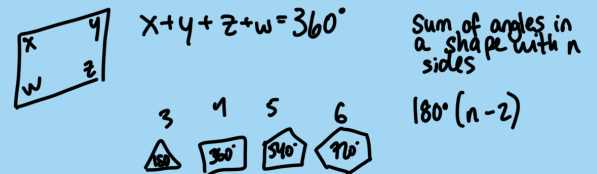
EAT - Exterior Angle Theorem



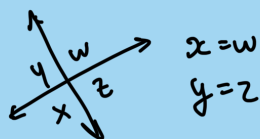
CAT - Complementary Angle Theorem



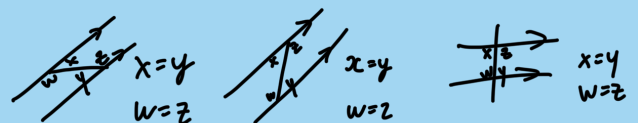
SAQT - Sum of Angles in a Quadrilateral Theorem



OAT - Opposite Angle Theorem



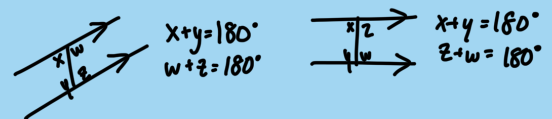
Z Pattern (Z)



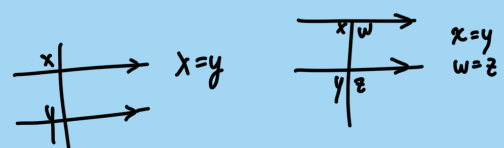
ITT - Isosceles Triangle Theorem



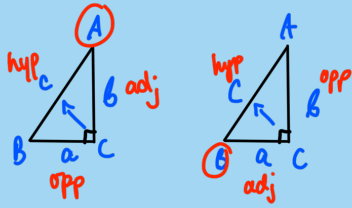
C Pattern (C)



F Pattern (F)



Introduction to Trig Triangles



Hypotenuse - longest
 Adjacent - next to
 Opposite - opposite to angle

Sine \rightarrow sin
 Cosine \rightarrow cos
 tangent \rightarrow tan

Calculators: click **MODE** & select DEGREES

trig ratio \rightarrow angle

① $\sin(35^\circ) \approx 0.57$

angle \rightarrow ratio

① $\sin x = 0.721$
 $\sin^{-1} \sin x = \sin^{-1}(0.721)$
 $x = \sin^{-1}(0.721)$
 $x \approx 16.14^\circ$

ROUNDING

\rightarrow Convention - unless stated otherwise;

- round all angles to whole nums
- round all ratios 4 dec. places
- round all sides to 1 dec. place

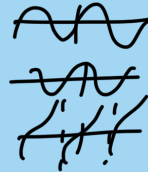
\rightarrow Note - don't round if using the value for another calculation, use **ANS** button

SOHCAHTOA

trig ratios = primary ratios

(sin) sine $\rightarrow \frac{\text{opp}}{\text{hyp}}$
 (cos) cosine $\rightarrow \frac{\text{adj}}{\text{hyp}}$
 (tan) tangent $\rightarrow \frac{\text{opp}}{\text{adj}}$

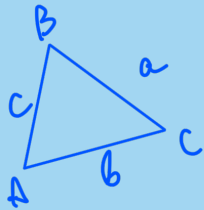
sine $\rightarrow y = \sin x$
 cosine $\rightarrow y = \cos x$
 tangent $\rightarrow y = \tan x$



Right Triangles

- ① SATT $\rightarrow c^2 = a^2 + b^2$
- ② Pythag Thm $\rightarrow a^2 + b^2 = c^2$
- ③ Trig \rightarrow SOHCAHTOA

Sine Law



Finding SIDES

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Finding ANGLES

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

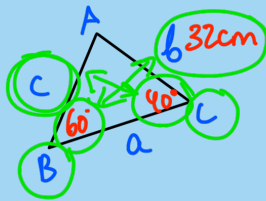
↳ "Across" from each other

(side & opp. angle)

(one other side or angle)



eg. Find side c

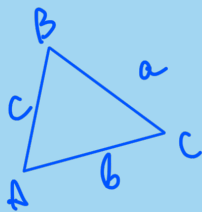


$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{32}{\sin 60} = \frac{c}{\sin 40}$$

$$c \approx 24 \text{ cm}$$

Cosine Law



on the left side, put the letter of the side / angle you are looking for

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

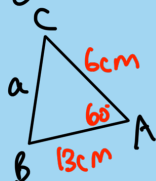
if looking for A or a
B or b
C or c

↳ all 3 sides

→ two sides & contained angle



eg. In $\triangle ABC$ solve for a

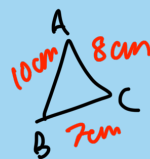


$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 6^2 + 13^2 - 2(6)(13) \cos 60^\circ$$

$$a \approx 11.27 \text{ cm}$$

Find CA



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 8^2 + 10^2 - 2(8)(10) \cos 115^\circ$$

$$a = \cos^{-1} \left(\frac{115}{160} \right)$$

$$A \approx 44.05^\circ$$