

Lesson 5

GCSE Mathematics Non-Right Angled Trigonometry

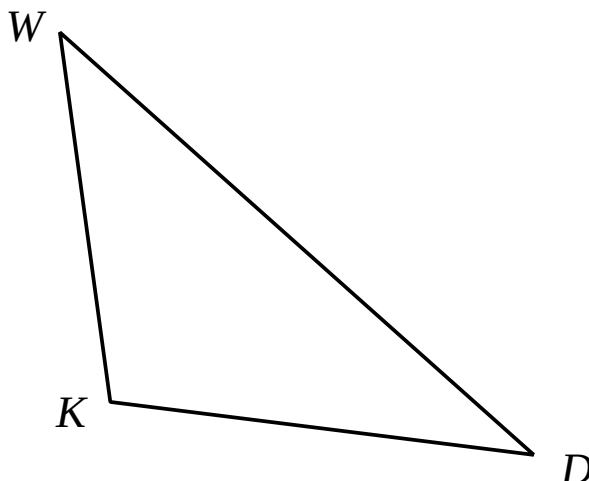
5.1 Alphabet Soup Cosine Rule

In the previous Lesson, all our triangles were labelled A , B and C and every problem was arranged so that length c was to be found.

Often different lettering is used, as the next example illustrates.

5.2 Example

- (i) On $\triangle WKD$, place the letters w , k and d .



- (ii) On $\triangle WKD$, mark on that;
- WD is of length 16.3 cm.
 - WK is of length 11.6 cm.
 - $\angle W$ is 34° .
 - KD is the length x , which is to be found.
- (iii) Mark the *included* angle with a star, *.
- (iv) For $\triangle WKD$, write down the cosine rule for w^2 , in terms of k , d and W .
- (v) Use the cosine rule to find the length of x .
- (vi) Find the area of $\triangle WKD$.

5.3 Exercise

Question 1

For $\triangle HMS$, write down the cosine rule for h^2 , in terms of m , s and H .

Question 2

For $\triangle BAT$, write down the cosine rule for a^2 , in terms of b , t and A .

Question 3

For $\triangle MAD$, write down the cosine rule for m^2 .

Question 4

For $\triangle ABC$, write down the cosine rule for;

(i) c^2

(ii) b^2

(iii) a^2

Question 5

$\triangle ZEN$ has $EN = 4.3$ cm, $ZE = 6.5$ cm, and $\angle E = 66^\circ$.

- (i) Sketch, roughly, $\triangle ZEN$ marking on the two known lengths & included angle.
- (ii) Write down the cosine rule for e^2 .
- (iii) Find the length of side ZN , accurate to 2 decimal places.
- (iv) Find the area of $\triangle ZEN$, accurate to 2 decimal places.

Question 6

$\triangle ICU$ has $IU = 10.2$ cm, $IC = 3.8$ cm, and $\angle I = 41.5^\circ$.

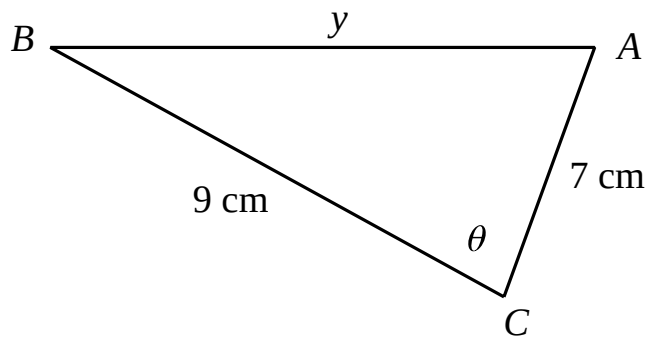
- (i) Sketch, roughly, $\triangle ICU$ marking on the two known lengths & included angle.
- (ii) Write down the cosine rule for i^2 .
- (iii) Find the length of side CU , clearly stating the units of your answer.
- (iv) Find the area of $\triangle ICU$, clearly stating the units of your answer.

Question 7

$\triangle OMG$ has $OM = 5.3$ km, $MG = 7.9$ km, and $\angle M = 127^\circ$.

- (i) Sketch, roughly, $\triangle OMG$ marking on the two known lengths & included angle.
- (ii) Write down the cosine rule for m^2 .
- (iii) Find the length of side OG , clearly stating the units of your answer.
- (iv) Find the area of $\triangle OMG$, clearly stating the units of your answer.

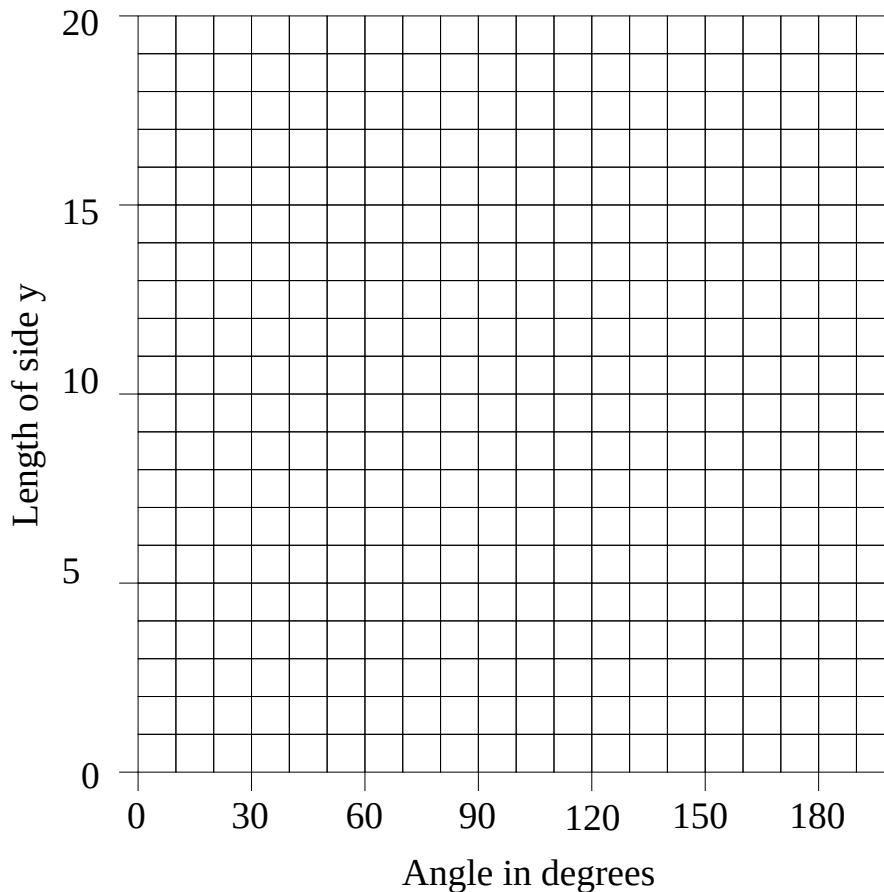
Question 8



(i) Work out the length y for the values of θ given in the table below;

θ	0°	30°	60°	90°	120°	150°	180°
y							

(ii) Plot a graph of your results with θ on the x-axis and length y on the y-axis



(iii) What happens as θ continues to increase beyond 180° and up to 360° ?

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com