

Exercise 6.6 Finding areas of non-right-angled triangles using Hero's formula and trigonometry

Answers should be given to 3 decimal places for lengths and areas, and to the nearest minute for angles, unless otherwise stated.

- In the $\triangle ABC$, $\angle ABC = 48^\circ 17'$, $BC = 7$ and $AB = 4$. Find each of the following and check your result using trigonometry.
 - length AC
 - the area of $\triangle ABC$ using Hero's formula.
- Find the area of $\triangle ABC$ using either trigonometry or Hero's formula given each of these sets of conditions.
 - $a = 5$ cm, $c = 2$ cm, $\angle B = 42^\circ$
 - $AC = 12$, $AB = 8$, $\angle BAC = 23^\circ$
 - $a = 1.2$, $b = 2.3$, $\angle C = 22^\circ 15'$
 - $c = 12.7$, $b = 9.2$, $\angle A = 104^\circ 34'$
- Choose the correct answer. In $\triangle ABC$ if $a = 8$, $c = 4$ and $b = 7$ then the area of the triangle is:
 A 31.4 B 92.813 C 13.998 D 12.665 E 11.786
- Choose the correct answer. In $\triangle ABC$ if $AB = 5$ km, $BC = 8$ km and $AC = 10$ km then the area of the triangle is:
 A 34 km^2 B 19.81 km^2 C 52.876 km^2 D 10.665 km^2 E 34 km
- Thanh has a farm in the shape of a triangle. The three fences are 8.7 km, 4.8 km and 9.7 km long. Find the area of land to the nearest square kilometre.
- Find the angles of a triangle and the area of it if its lengths are 8 cm, 12 cm and 17 cm.
- A triangular field has two sides of length 42 m and 58 m with an included angle of 71° .
 - Find the length of the third side.
 - Find the other angles in the triangle.
 - Find the area of the field.
- $\triangle ABC$ has one side length which is 3 cm, and the perimeter of the triangle is 12 cm. If the area of the triangle is 6 cm^2 , find the lengths of the other two sides if they are integer values.
- $\triangle PQR$ has an area of 36 m^2 . If $p = 6$ m and $r = 13$ m, find $\angle Q$.
- An oil spill is being contained by a series of pontoons that form a triangular field. The pontoons are 250 m, 200 m and 320 m long. What is the area that is being contained?
- A triangular computer network has been constructed using cables 280 km, 560 km and 420 km long. This will service the boundaries of this network. What area will it cover to the nearest km^2 ?

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- a 5.266 b 10.45
- a 3.346 cm^2 b 18.755 c 0.523 d 56.542
- C 4 B 5 21 km^2
- 6 $25^\circ 15'$, $39^\circ 47'$, $114^\circ 58'$, 43.519 cm^2
- 7 a 59.513 m b $41^\circ 51'$, $67^\circ 9'$ c 1151.642 m^2
- 8 4 cm, 5 cm 9 $67^\circ 23'$
- 10 24999.988 m^2 11 56933 km^2