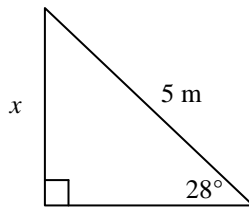


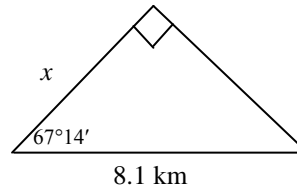
Mathematics

1. Find the value of
- x
- , giving your answer correct to two decimal places:

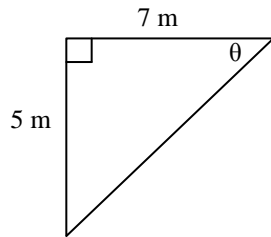
(a)



(b)



2. Find the value of
- θ
- correct to the nearest minute.



3. If
- $\cos \theta = \frac{3}{5}$
- and
- $0^\circ \leq \theta \leq 360^\circ$
- , find: (a)
- $\sin \theta$

(b) $\cot \theta$

4. Find the exact value of: (a)
- $\tan 225^\circ$
- (b)
- $\sin 135^\circ$
- (c)
- $\cos 300^\circ$
-
- (d)
- $\cos 240^\circ$
- (e)
- $\tan 480^\circ$
- (f)
- $\sin (-45^\circ)$

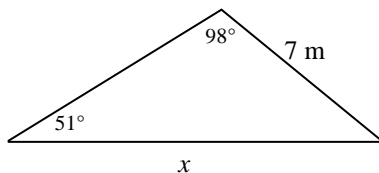
5. Show that: (a)
- $\operatorname{cosec} \theta - \sin \theta = \cot \theta \cos \theta$

(b)
$$\frac{\tan \theta}{\sec \theta - 1} - \frac{\tan \theta}{\sec \theta + 1} = 2 \cot \theta$$

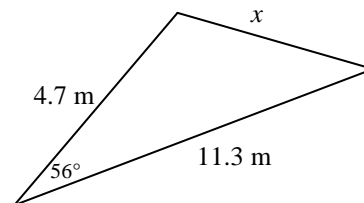
6. Solve
- $12 \cos \theta = 7 \cos \theta + 2$
- for
- $0^\circ \leq \theta \leq 360^\circ$
- .

7. Find the value of
- x
- correct to one decimal place:

(a)



(b)



8. Find the area of the triangle drawn in Q7 (b).

9. Point B is South-East of point A and at a distance of
- 2 km
- from it.

From point A, a point P bears 057°T and from B, point P bears 348°T .(a) Find the size of $\angle\text{PAB}$ and $\angle\text{APB}$.

(b) Find the distance from A to P, correct to two decimal places.

Extension 1

1. Prove that:

(a) $\frac{\sin(A+B) + \sin(A-B)}{\cos(A+B) + \cos(A-B)} = \tan A$

(b) $\frac{\sin 2A + \sin A}{1 + \cos 2A + \cos A} = \tan A$

2. Find the exact value of $\cos 105^\circ$.

3. If α and β are acute angles and $\sin \alpha = \frac{3}{5}$ and $\tan \beta = \frac{7}{24}$, find the exact value of:

(a) $\sin(\alpha - \beta)$

(b) $\tan(\alpha + \beta)$

(c) $\cos 2\alpha$

4. If $t = \tan \frac{\theta}{2}$, express each of the following in terms of t .

(a) $\sin \theta + \cos \theta$

(b) $\frac{2}{1 + \cos \theta}$

5. Solve each of the following equations for $0^\circ \leq \theta \leq 360^\circ$:

(a) $\cot \theta - 3 \tan \theta = 2$

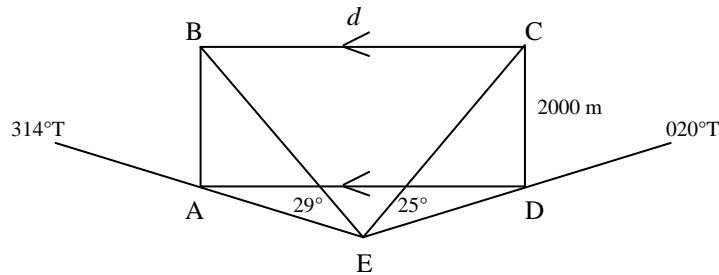
(b) $\sin 2\theta = \sin \theta$

(c) $\sin^2 \theta - 5 \sin \theta - 2 \cos^2 \theta = 0$

6. (a) Write the expression $\sqrt{3} \sin \theta - \cos \theta = 1$ in the form $R \sin(\theta - \alpha)$

(b) Hence, or otherwise, solve the equation $\sqrt{3} \sin \theta - \cos \theta = 1$ for $0^\circ \leq \theta \leq 360^\circ$.

7.



An aeroplane flying at 2000 m is observed to be on a bearing of 314°T with an angle of elevation of 29° .

After 1 minute it is bearing 020°T at an angle of elevation of 25° . If it maintains this altitude, calculate:

(a) the distance AE to the nearest metre

(b) the distance DE to the nearest metre

(c) the size of angle AED to the nearest degree

(d) and hence find the distance, d , the plane travels in that minute and its speed in km/h