

Trig Revision

- A triangle has side lengths 3 cm, 4 cm and 6 cm. Find the sizes of the angles.
- A ship sails 70 km from port on a bearing of 048° , then 50 km on a bearing of 150° . How far and on what bearing will it need to sail to get back to port?
- Without using a calculator, give the exact values of the following. Draw a circle diagram for each angle not in the first quadrant.
(a) $\sin 30^\circ$ (b) $\cos 45^\circ$ (c) $\tan 60^\circ$ (d) $\cos 90^\circ$ (e) $\tan 0^\circ$ (f) $\sin 60^\circ$
(g) $\cos 180^\circ$ (h) $\tan 225^\circ$ (i) $\sin(-30^\circ)$ (j) $\cos 330^\circ$ (k) $\tan 150^\circ$ (l) $\sin 945^\circ$
- Without a calculator, solve the following for $-360^\circ < x < 360^\circ$. Draw a circle diagram for each.
(a) $\sin x = 0.5$ (b) $\cos x = -\frac{\sqrt{3}}{2}$ (c) $\tan x = -1$ (d) $\sin x = \frac{1}{\sqrt{2}}$
- With a calculator, solve the following for $0^\circ < x < 360^\circ$
(a) $\tan x = 0.4$ (b) $\sin x = -0.83$ (c) $\cos x = 0.11$ (d) $\tan x = -2.5$
- With a calculator, solve the following for $0^\circ < x < 360^\circ$
(a) $\sin x + 2 = 1.7$ (b) $3 \sin x = 0.9$ (c) $\tan 2(x-30) = -2$
(d) $4 \cos(x+10) - 3 = -2$ (e) $5 \sin 2(x-15) + 3 = 1$
- Draw the graphs of
(a) $y = 3 \sin 4x + 2$ (b) $y = -0.5 \cos 2(x-10) - 2$
- The height of the tide on Tuesday is given by the function $h = 1.5 \sin 30(t + 0.8) + 1.8$ where h is the height in metres and t is the time in hours since midnight.
(a) Find the tide height at 5 a.m.
(b) Find the times of the high and low tides on Tuesday.
(c) Find the times during Tuesday when the tide height is 0.7 m.
(d) A causeway is traversable only when the tide height is below 1 m. For how long on Tuesday will the causeway be traversable?
(e) For what fraction of the time on Tuesday will the tide be within 0.2 m of the high tide level?
- The temperature follows a sinusoidal pattern over time ranging from 10° to 24° each day with the highest temperature occurring at 3 pm.
(a) Write a formula for the temperature, T at any number of hours, t , since midnight.
(b) What is the temperature at 11 a.m.?
(c) For how long each night is the temperature below 12° ?

Answers

1. $117^\circ, 36^\circ, 26^\circ$
2. 77 km, 087°
3. (a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\sqrt{3}$ (d) 0 (e) 0 (f) $\frac{\sqrt{3}}{2}$
(g) -1 (h) 1 (i) $-\frac{1}{2}$ (j) $\frac{\sqrt{3}}{2}$ (k) $\frac{1}{\sqrt{3}}$ (l) $-\frac{1}{\sqrt{2}}$
4. (a) $30^\circ, 150^\circ, -210^\circ, -330^\circ$ (b) $150^\circ, 210^\circ, -150^\circ, -210^\circ$
(c) $135^\circ, 315^\circ, -45^\circ, -225^\circ$ (d) $45^\circ, 135^\circ, -225^\circ, -315^\circ$
5. (a) $22^\circ, 112^\circ$ (b) $236^\circ, 304^\circ$ (c) $84^\circ, 276^\circ$ (d) $112^\circ, 292^\circ$
6. (a) $198^\circ, 343^\circ$ (b) $17^\circ, 163^\circ$ (c) $64^\circ, 154^\circ, 244^\circ, 334^\circ$
(d) $64^\circ, 273^\circ$ (e) $33^\circ, 147^\circ, 213^\circ, 327^\circ$
7. (a) $a = 3, b = 4, c = 0, d = 2$; amp = 3, per = $\frac{\pi}{2}$, phase shift = 0, mp = 2.
(b) $a = 0.5, b = 2, c = -\frac{\pi}{6}, d = -2$; amp = 0.5, per = π , phase shift = $\frac{\pi}{6}$, mp = -2
Check graphs with calculator.
8. (a) 1.27 m (b) High tides 1:08 am, 1:42 pm; low tides 7:25 am, 7:59 pm
(c) 5:56 am, 8:52 am, 6:30 pm, 9:29 pm (d) 8 h 6 min (e) 0.235
9. (a) $T = -7 \cos \frac{\pi}{12}(t - 3) + 17$ (b) 13.5° (c) 5 h 55 min