

## 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  $048^\circ$ , then 50 km on a bearing of  $150^\circ$ . 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  $10^\circ$  to  $24^\circ$  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  $12^\circ$ ?

## Answers

1.  $117^\circ, 36^\circ, 26^\circ$
2. 77 km,  $087^\circ$
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 =  $\pi$ , 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)  $13.5^\circ$                       (c) 5 h 55 min