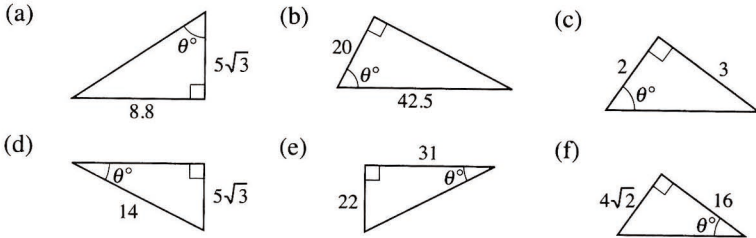


### Exercise 10D

1 For each triangle sketched below,

- (i) use Pythagoras' theorem to find the length of the third side in an exact form;  
 (ii) write down the exact values of  $\sin \theta^\circ$ ,  $\cos \theta^\circ$  and  $\tan \theta^\circ$ .



- 2 (a) Given that angle  $A$  is obtuse and that  $\sin A^\circ = \frac{5}{14}\sqrt{3}$ , find the exact value of  $\cos A^\circ$ .  
 (b) Given that  $180 < B < 360$  and that  $\tan B^\circ = -\frac{21}{20}$ , find the exact value of  $\cos B^\circ$ .  
 (c) Find all possible values of  $\sin C^\circ$  for which  $\cos C^\circ = \frac{1}{2}$ .  
 (d) Find the values of  $D$  for which  $-180 < D < 180$  and  $\tan D^\circ = 5 \sin D^\circ$ .

3 Use  $\tan \theta^\circ \equiv \frac{\sin \theta^\circ}{\cos \theta^\circ}$ ,  $\cos \theta^\circ \neq 0$ , and  $\cos^2 \theta^\circ + \sin^2 \theta^\circ \equiv 1$  to establish the following.

(a)  $\frac{1}{\sin \theta^\circ} - \frac{1}{\tan \theta^\circ} \equiv \frac{1 - \cos \theta^\circ}{\sin \theta^\circ}$  (b)  $\frac{\sin^2 \theta^\circ}{1 - \cos \theta^\circ} \equiv 1 + \cos \theta^\circ$   
 (c)  $\frac{1}{\cos \theta^\circ} + \tan \theta^\circ \equiv \frac{\cos \theta^\circ}{1 - \sin \theta^\circ}$  (d)  $\frac{\tan \theta^\circ \sin \theta^\circ}{1 - \cos \theta^\circ} \equiv 1 + \frac{1}{\cos \theta^\circ}$

4 Solve the following equations for  $\theta$ , giving all the roots in the interval  $0 \leq \theta \leq 360$  correct to the nearest 0.1.

(a)  $4 \sin^2 \theta^\circ - 1 = 0$  (b)  $\sin^2 \theta^\circ + 2 \cos^2 \theta^\circ = 2$   
 (c)  $10 \sin^2 \theta^\circ - 5 \cos^2 \theta^\circ + 2 = 4 \sin \theta^\circ$  (d)  $4 \sin^2 \theta^\circ \cos \theta^\circ = \tan^2 \theta^\circ$

5 Find all values of  $\theta$ ,  $-180 < \theta < 180$ , for which  $2 \tan \theta^\circ - 3 = \frac{2}{\tan \theta^\circ}$ .

### Miscellaneous exercise 10

1 Write down the period of each of the following.

(a)  $\sin x^\circ$  (b)  $\tan 2x^\circ$

2 By considering the graph of  $y = \cos x^\circ$ , or otherwise, express the following in terms of  $\cos x^\circ$ .

(a)  $\cos(360 - x)^\circ$  (b)  $\cos(x + 180)^\circ$

3 Draw the graph of  $y = \cos \frac{1}{2} \theta^\circ$  for  $\theta$  in the interval  $-360 \leq \theta \leq 360$ . Mark clearly the coordinates of the points where the graph crosses the  $\theta$ - and  $y$ -axes.

4 Solve the following equations for  $\theta$ , giving your answers in the interval  $0 \leq \theta \leq 360$ .

(a)  $\tan \theta^\circ = 0.4$  (b)  $\sin 2\theta^\circ = 0.4$