b) $\sin A = \dfrac{y}{5}$; $\sin A = 0.534$

c) $\cos A = \dfrac{x}{5}$, $\cos A = 0.836$; $\tan A = \dfrac{y}{x}$, $\tan A = 0.6388...$

Step 3 Animation will vary.

Step 4
a) The sine and cosine increase and decrease between 1 and −1. The tangent can take any value.
b) The sine and cosine ratios are both 0.707 at 45° and at 225°.
c) The signs of the ratios change. In quadrant II, the sine ratios are positive, but the cosine and tangent are negative. In quadrant III, the tangent ratios are positive but the sine and cosine are negative. In quadrant IV, the cosine ratios are positive but the sine and tangent are negative.
d) The sine ratio divided by the cosine ratio is equal to the tangent ratio. Yes, this is true for all angles.

2.3 The Sine Law

Section 2.3   Page 108   Question 1

a)
$$\frac{a}{\sin 35°} = \frac{10}{\sin 40°}$$
$$a = \frac{10\sin 35°}{\sin 40°}$$
$$a = 8.923...$$
The unknown side $a = 8.9$, to the nearest tenth.

b)
$$\frac{b}{\sin 48°} = \frac{65}{\sin 75°}$$
$$b = \frac{65\sin 48°}{\sin 75°}$$
$$b = 50.008...$$
The unknown side $b = 50.0$, to the nearest tenth.

c) $\dfrac{\sin\theta}{12} = \dfrac{\sin 50°}{65}$

$\sin\theta = \dfrac{12\sin 50°}{65}$

$\theta = \sin^{-1}\left(\dfrac{12\sin 50°}{65}\right)$

$\theta = 8.130...$

The measure of angle θ is 8°, to the nearest degree.

d) $\dfrac{\sin A}{25} = \dfrac{\sin 62°}{32}$

$\sin A = \dfrac{25\sin 62°}{32}$

$\angle A = \sin^{-1}\left(\dfrac{25\sin 62°}{32}\right)$

$\angle A = 43.614...$

The measure of $\angle A$ is 44°, to the nearest degree.

Section 2.3   Page 108   Question 2

a) $\angle C = 180° - (88° + 35°)$

$\angle C = 57°$

$\dfrac{c}{\sin C} = \dfrac{b}{\sin B}$

$\dfrac{c}{\sin 57°} = \dfrac{44}{\sin 88°}$

$c = \dfrac{44\sin 57°}{\sin 88°}$

$c = 36.923...$

The length of AB is 36.9 mm, to the nearest tenth of a millimetre.

b) $\dfrac{c}{\sin C} = \dfrac{a}{\sin A}$

$\dfrac{c}{\sin 118°} = \dfrac{45}{\sin 52°}$

$c = \dfrac{45\sin 118°}{\sin 52°}$

$c = 50.421...$

The length of AB is 50.4 m, to the nearest tenth of a metre.