

PRACTISING

4. Determine the exact value of each trigonometric expression.
- K** a) $\sin 30^\circ \times \tan 60^\circ - \cos 30^\circ$ c) $\tan^2 30^\circ - \cos^2 45^\circ$
 b) $2\cos 45^\circ \times \sin 45^\circ$ d) $1 - \frac{\sin 45^\circ}{\cos 45^\circ}$

5. Using exact values, show that $\sin^2 \theta + \cos^2 \theta = 1$ for each angle.
 a) $\theta = 30^\circ$ b) $\theta = 45^\circ$ c) $\theta = 60^\circ$

6. Using exact values, show that $\frac{\sin \theta}{\cos \theta} = \tan \theta$ for each angle.
 a) $\theta = 30^\circ$ b) $\theta = 45^\circ$ c) $\theta = 60^\circ$

7. Using the appropriate special triangle, determine θ if $0^\circ \leq \theta \leq 90^\circ$.

- a) $\sin \theta = \frac{\sqrt{3}}{2}$ c) $2\sqrt{2} \cos \theta = 2$
 b) $\sqrt{3} \tan \theta = 1$ d) $2 \cos \theta = \sqrt{3}$

8. A 5 m stepladder propped against a classroom wall forms an angle of 30° with the wall. Exactly how far is the top of the ladder from the floor? Express your answer in radical form. What assumption did you make?

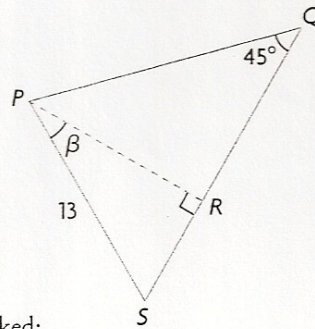
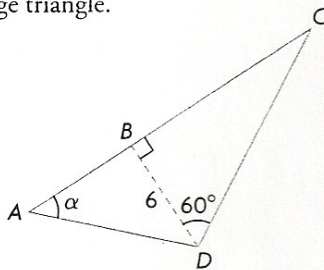
9. Show that $\tan 30^\circ + \frac{1}{\tan 30^\circ} = \frac{1}{\sin 30^\circ \cos 30^\circ}$.

10. A baseball diamond forms a square of side length 27.4 m. Sarah says that she used a special triangle to calculate the distance between home plate and second base.

- a) Describe how Sarah might calculate this distance.
 b) Use Sarah's method to calculate this distance to the nearest tenth of a metre.

11. Determine the exact area of each large triangle.

- I** a) $\tan \alpha = 1$
 b) $\cos \beta = \frac{\sqrt{3}}{2}$



12. To claim a prize in a contest, the following skill-testing question was asked:

- C** Calculate $\sin 45^\circ(1 - \cos 30^\circ) + 5 \tan 60^\circ(\sin 60^\circ - \tan 30^\circ)$.
 a) Louise used a calculator to evaluate the expression. Determine her answer to three decimal places.
 b) Megan used exact values. Determine her answer in radical form.
 c) Only Megan received the prize. Explain why this might have occurred.

Communication **Tip**

$\tan^2 30^\circ = (\tan 30^\circ)(\tan 30^\circ)$.
 So the expression is squared, not the angle.

Extending

13. If $\cot \alpha = \sqrt{3}$, calculate $(\sin \alpha)(\cot \alpha) - \cos^2 \alpha$ exactly.

14. If $\csc \beta = 2$, calculate $\frac{\tan \beta}{\sec \beta} - \sin^2 \beta$ exactly.

15. Using exact values, show that $1 + \cot^2 \theta = \csc^2 \theta$ for each angle.
 a) $\theta = 30^\circ$ b) $\theta = 45^\circ$ c) $\theta = 60^\circ$