1. Convert from degrees to radians.
   (a) $300^\circ$  (b) $-18^\circ$

2. Convert from radians to degrees.
   (a) $5\pi/6$  (b) 2

3. Find the length of an arc of a circle with radius 12 cm if the arc subtends a central angle of $30^\circ$.

4. Find the exact values.
   (a) $\tan(\pi/3)$  (b) $\sin(7\pi/6)$  (c) $\sec(5\pi/3)$

5. Express the lengths $a$ and $b$ in the figure in terms of $\theta$.

6. If $\sin x = \frac{1}{2}$ and $\sec y = \frac{5}{4}$, where $x$ and $y$ lie between 0 and $\pi/2$, evaluate $\sin(x + y)$.

7. Prove the identities.
   (a) $\tan \theta \sin \theta + \cos \theta = \sec \theta$
   (b) $\frac{2 \tan x}{1 + \tan^2 x} = \sin 2x$

8. Find all values of $x$ such that $\sin 2x = \sin x$ and $0 \leq x \leq 2\pi$.

9. Sketch the graph of the function $y = 1 + \sin 2x$ without using a calculator.

ANSWERS TO DIAGNOSTIC TEST D: TRIGONOMETRY

1. (a) $5\pi/3$  (b) $-\pi/10$

2. (a) $150^\circ$  (b) $360/\pi \approx 114.6^\circ$

3. $2\pi$ cm

4. (a) $\sqrt{3}$  (b) $-\frac{1}{2}$  (c) 2

5. (a) $24 \sin \theta$  (b) $24 \cos \theta$

6. $\frac{1}{13}(4 + 6\sqrt{2})$

7. 0, $\pi/3$, $\pi$, $5\pi/3$, $2\pi$

9.

If you have had difficulty with these problems, you should look at Appendix D of this book.