1. (a) F (b) F (c) T (d) T (e) F (f) F (g) F (h) F (i) F (j) T (k) T (l) F (m) T (n) F (o) T (p) F
    (q) T (r) T (s) F (t) F

2. (a) $y = x$ (b) $-\dfrac{11\pi}{6}$ (c) $660°$ (d) $\dfrac{8}{\pi}$ meters (e) $5,\ \dfrac{2\pi}{3},\ -\dfrac{\pi}{3}$

(f) $\sin\theta = \dfrac{\text{opp}}{\text{hyp}}$, $\cos\theta = \dfrac{\text{adj}}{\text{hyp}}$, $\tan\theta = \dfrac{\text{opp}}{\text{adj}}$, $\csc\theta = \dfrac{\text{hyp}}{\text{opp}}$, $\sec\theta = \dfrac{\text{hyp}}{\text{adj}}$, $\cot\theta = \dfrac{\text{adj}}{\text{opp}}$

(g) $\dfrac{\sqrt{3}}{2}$ (h) $-\dfrac{1}{2}$ (i) 1 (j) $-1 \le x \le 1,\ \ 0 \le y \le \pi$ (k) $-\dfrac{\pi}{4}$ (l) $\dfrac{3\pi}{4}$ (m) $\dfrac{5\pi}{6}$ (n) $-\dfrac{\pi}{6}$

(o) $\dfrac{4}{5}$ (p) $\dfrac{1}{\tan x}$ (q) $\dfrac{\cos x}{\sin x}$ (r) $1 + \tan^2 x$ (s) $\sin x \cos y + \cos x \sin y$ (t) $\cos x \cos y + \sin x \sin y$

(u) $\cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$ (v) $\pm\sqrt{\dfrac{1-\cos x}{2}}$ (w) $\dfrac{\pi}{3} + k\pi,\ \ k$ is an integer

(x) $y = -2$ (y) $3^x = 8$ (z) $\ln x$ (aa) x (bb) x (cc) 0 (dd) 1 (ee) 5 (ff) 7

(gg) $2\log x + \log y - \dfrac{1}{2}\log(x+1)$ (hh) $\ln\dfrac{x^2 - y^2}{x^3}$

3. (a) $\dfrac{2x-1}{(x-1)^2}$ (b) $\dfrac{x(x+3)}{(x+4)(x+1)}$

4. (a) $x = \pm 2, \dfrac{3}{2}$ (b) $x = -6, 3$ (c) $x = k\pi,\quad x = \dfrac{\pi}{6} + 2k\pi,\quad x = \dfrac{5\pi}{6} + 2k\pi, k$ is an integer

    (d) $x = \dfrac{3\pi}{2} + 2k\pi,\quad x = \dfrac{\pi}{6} + 2k\pi,\quad x = \dfrac{5\pi}{6} + 2k\pi$, k is an integer (e) $x = \dfrac{5 + \log_2 7}{3}$ (may

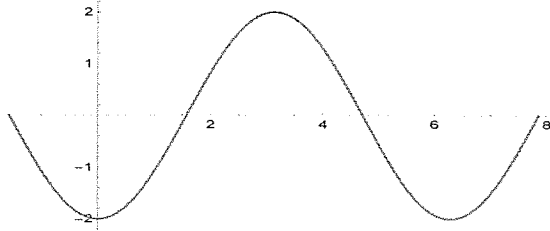   vary depending on the base of the log you choose.)

    (f) $x = -15$ (g) $x = 1$ (h) $x = 3$, $x = -4$ is an extraneous solution.

5. (a) $[1, 4]$ (b) $(-\infty - 1) \cup \left(\dfrac{7}{3}, \infty\right)$

6. (a) $x = \dfrac{5}{\sin 70°}$ (b) $x = \sqrt{210^2 + 100^2 - 2(210)(100)\cos 40°}$ (c) $x = \sin^{-1}\left(\dfrac{4\sin 80°}{5}\right)$

7. $y = 2\sin\left(x - \dfrac{\pi}{2}\right)$ on $\left[-\dfrac{\pi}{2}, \dfrac{5\pi}{2}\right]$

Amplitude: 2   Period: 2π Horizontal Shift: $\dfrac{\pi}{2}$

8. (a) $\dfrac{1}{2}$, π, $-\dfrac{\pi}{3}$ (b) $y = -\dfrac{1}{2}\cos\left[2\left(x + \dfrac{\pi}{3}\right)\right]$ (may vary)

9. $x = 200\sqrt{3}$ feet
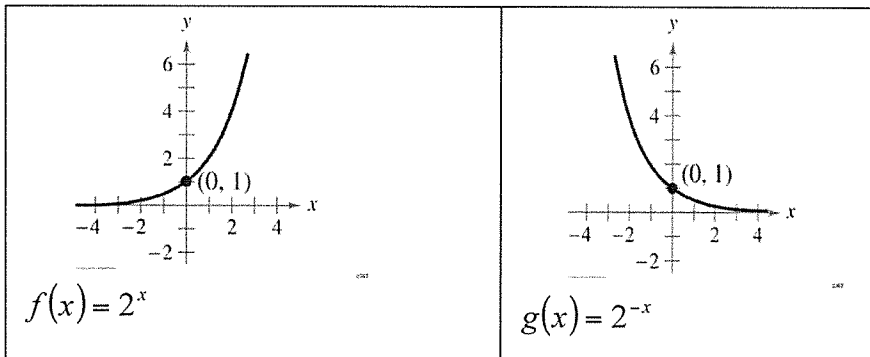
10. $h = \dfrac{40\sin 35°}{\sin 50°}$

11. $\theta = \cos^{-1}\left(\dfrac{210^2 + 230^2 - 120^2}{(2)(210)(230)}\right)$

12. $\sin 2x = -\dfrac{3}{5}$, $\cos 2x = \dfrac{4}{5}$

13. (a) $L = \cos^2 x \csc x - \csc x = \csc x\left(\cos^2 x - 1\right) = \csc x\left(-\sin^2 x\right) = \dfrac{1}{\sin x}\left(-\sin^2 x\right) = -\sin x = R$

   (b) $L = \dfrac{1}{1 - \sin^2 x} = \dfrac{1}{\cos^2 x} = \sec^2 x = 1 + \tan^2 x = R$

14.

$f(x) = 2^x$

$g(x) = 2^{-x}$

15. (a) $f(x) = -\log_3(-x)$,   (b) $f(x) = \log_3(1 - x)$,   (c) $f(x) = -\log_3(x + 2)$,   (d) $f(x) = \log(x - 1)$