

## 0.1 Exercises

1. Determine if each of the following are functions.
  - (a)  $y = x^2 + 1$ .
  - (b)  $y^2 = x + 1$ .
2. Given  $f(x) = 3x - 2$  and  $g(x) = \frac{1}{3}x + \frac{2}{3}$  find each of the following.
  - (a)  $(f \circ g)(x)$ .
  - (b)  $(g \circ g)(x)$ .
  - (c)  $(g \circ f)(x)$ .
3. Given  $f(x) = 3x - 2$  find  $f^{-1}(x)$ .
4. Given  $g(x) = \sqrt{x - 3}$  find  $g^{-1}(x)$ .
5. Given  $h(x) = \frac{x+4}{2x-5}$  find  $h^{-1}(x)$ .
6. Evaluate each of the following
  - (a)  $\sin(\frac{2\pi}{3})$  and  $\sin(\frac{-2\pi}{3})$ .
  - (b)  $\cos(\frac{7\pi}{6})$  and  $\cos(\frac{-7\pi}{6})$ .
  - (c)  $\tan(\frac{-\pi}{4})$  and  $\tan(\frac{7\pi}{4})$ .
  - (d)  $\sec(\frac{25\pi}{6})$ .
7. Solve  $2 \cos(t) = \sqrt{3}$  on  $[-2\pi, 2\pi]$ .
8. Solve  $2 \sin(5x) = -\sqrt{3}$  on  $[-\pi, 2\pi]$ .
9. Solve  $9 \sin(2x) = -5 \cos(2x)$  on  $[-10, 0]$ .
10. Solve  $6 \sin(\frac{x}{2}) = 1$  on  $[-20, 30]$ .
11. Solve  $3 \sin(5z) = -2$  on  $[0, 1]$ .
12. Solve  $7 \sec(3t) = -10$ .
13. Solve  $\cos(4\theta) = -1$ .
14. Solve  $2 \cos(6y) + 11 \cos(6y) \sin(3y) = 0$ .
15. Solve  $4 \sin^2(\frac{t}{3}) - 3 \sin(\frac{t}{3}) = 1$ .
16. Write each of the following in terms of simpler logarithms.
  - (a)  $\ln x^3 y^4 z^5$
  - (b)  $\log_3(\frac{9x^4}{\sqrt{y}})$
  - (c)  $\log(\frac{x^2+y^2}{(x-y)^3})$

17. Solve  $7 + 15e^{1-3z} = 10$ .

18. Solve  $10^{t^2-t} = 100$ .

19. Solve  $x - xe^{5x+2} = 0$ .

20. Solve  $5(x^2 - 4) = (x^2 - 4)e^{7-x}$ .

21. Solve  $4e^{1+3x} - 9e^{5-2x} = 0$ .

22. Solve  $3 + 2\ln\left(\frac{x}{7} + 3\right) = -4$ .

23. Solve  $2\ln(\sqrt{x}) - \ln(1-x) = 2$ .

24. Solve  $\log x + \log(x-3) = 1$ .