

Section 1.3 Exercises

1. $y = x^3 + 1$; (e)
2. $y = |x| - 2$; (g)
3. $y = -\sqrt{x}$; (j)
4. $y = -\sin x$ or $y = \sin(-x)$; (a)
5. $y = -x$; (i)
6. $y = (x - 1)^2$; (f)
7. $y = \text{int}(x + 1)$; (k)

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8. $y = -\frac{1}{x}$; (h)

9. $y = (x + 2)^3$; (d)

10. $y = e^x - 2$; (c)

11. $2 - \frac{4}{1 + e^{-x}}$; (l)

12. $y = \cos x + 1$; (b)

13. Exercise 8

14. Exercise 3

15. Exercises 7, 8

16. Exercise 7 (Remember that a continuous function is one that is continuous at every point in its domain.)

17. Exercises 2, 4, 6, 10, 11, 12

18. Exercises 3, 4, 11, 12

19. $y = x, y = x^3, y = \frac{1}{x}, y = \sin x$

20. $y = x, y = x^3, y = \sqrt{x}, y = e^x, y = \ln x, y = \frac{1}{1 + e^{-x}}$

21. $y = x^2, y = \frac{1}{x}, y = |x|$

22. $y = \sin x, y = \cos x, y = \text{int}(x)$

23. $y = \frac{1}{x}, y = e^x, y = \frac{1}{1 + e^{-x}}$

24. $y = x, y = x^3, y = \ln x$

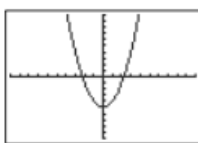
25. $y = \frac{1}{x}, y = \sin x, y = \cos x, y = \frac{1}{1 + e^{-x}}$

26. $y = x, y = x^3, y = \text{int}(x)$

27. $y = x, y = x^3, y = \frac{1}{x}, y = \sin x$

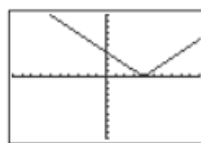
28. $y = \sin x, y = \cos x$

29. Domain: $(-\infty, \infty)$
Range: $[-5, \infty)$



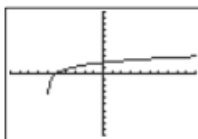
$[-10, 10]$ by $[-10, 10]$

30. Domain: $(-\infty, \infty)$
Range: $[0, \infty)$



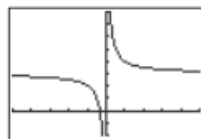
$[-10, 10]$ by $[-10, 10]$

31. Domain: $(-6, \infty)$
Range: $(-\infty, \infty)$



$[-10, 10]$ by $[-10, 10]$

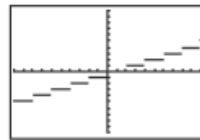
32. Domain: $(-\infty, 0) \cup (0, \infty)$
Range: $(-\infty, 3) \cup (3, \infty)$



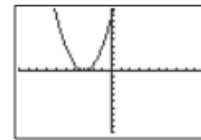
$[-5, 5]$ by $[-2, 8]$

33. Domain: $(-\infty, \infty)$
Range: All integers

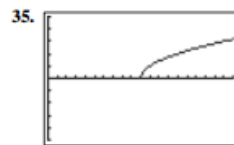
34. Domain: $(-\infty, \infty)$
Range: $[0, \infty)$



$[-10, 10]$ by $[-10, 10]$

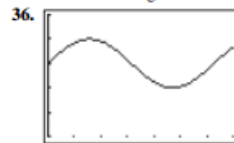


$[-10, 10]$ by $[-10, 10]$



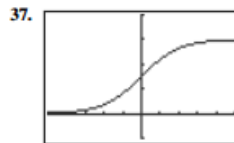
$[0, 20]$ by $[-5, 5]$

- (a) $r(x)$ is increasing on $[10, \infty)$.
- (b) $r(x)$ is neither odd nor even.
- (c) The one extreme is a minimum value of 0 at $x = 10$.
- (d) $r(x) = \sqrt{x - 10}$ is the square root function, shifted 10 units right.



$[0, 7]$ by $[2, 7]$

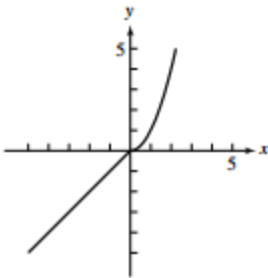
- (a) $f(x)$ is increasing on $\left[(2k - 1)\frac{\pi}{2}, (2k + 1)\frac{\pi}{2}\right]$ and decreasing on $\left[(2k + 1)\frac{\pi}{2}, (2k + 3)\frac{\pi}{2}\right]$, where k is an even integer.
- (b) $f(x)$ is neither odd nor even.
- (c) There are minimum values of 4 at $x = (2k - 1)\frac{\pi}{2}$ and maximum values of 6 at $x = (2k + 1)\frac{\pi}{2}$, where k is an even integer.
- (d) $f(x) = \sin(x) + 5$ is the sine function, $\sin(x)$, shifted 5 units up.



$[-5, 5]$ by $[-1, 4]$

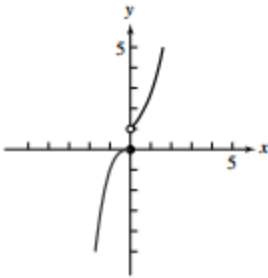
- (a) $f(x)$ is increasing on $(-\infty, \infty)$.
- (b) $f(x)$ is neither odd nor even.
- (c) There are no extrema.
- (d) $f(x) = \frac{3}{1 + e^{-x}}$ is the logistic function, $\frac{1}{1 + e^{-x}}$, stretched vertically by a factor of 3.

45.



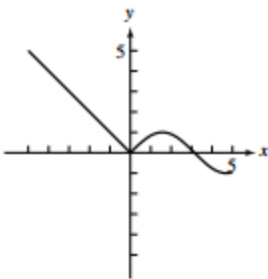
There are no points of discontinuity.

46.



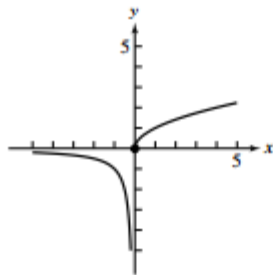
There is a point of discontinuity at $x = 0$.

47.



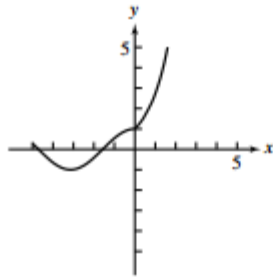
There are no points of discontinuity.

48.



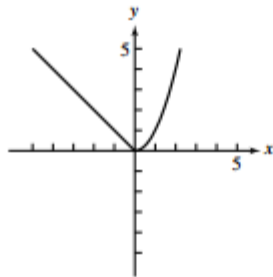
There is a point of discontinuity at $x = 0$.

49.



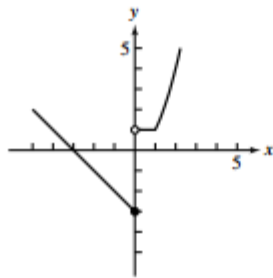
There are no points of discontinuity.

50.



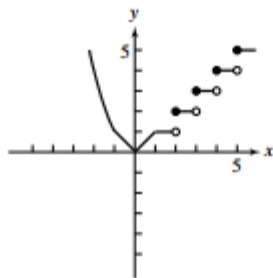
There are no points of discontinuity.

51.



There is a point of discontinuity at $x = 0$.

52.



There are points of discontinuity at $x = 2, 3, 4, 5, \dots$