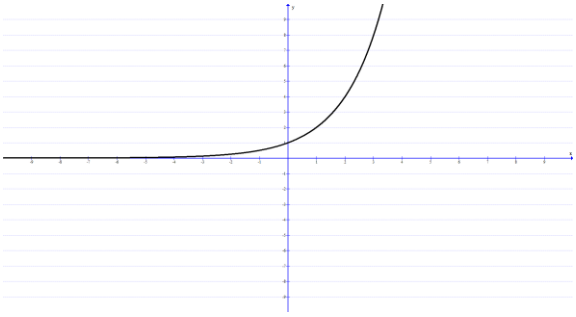
Section 6.3 answers

1) $f(x) = 2^x$

a) make a table of values and sketch a graph

x	f(x)
2	$2^2 = 4$ (2,4)
1	$2^1 = 2$ (1,2)
0	$2^0 = 1$ (0,1)
-1	$2^{-1} = ½$ (-1, ½)
-2	$2^{-2} = ¼$ (-2, ¼)

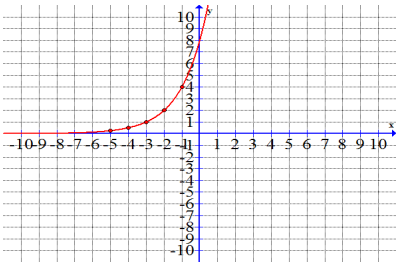


1b) domain $(-\infty, \infty)$ 1c) $range\ (0, \infty)$ 1d) y = 0

3) $f(x) = 2^{x+3}$

a) make a table of values and sketch a graph

x	f(x)
-5	$2^{-5+3} = 2^{-2} = = 1/2^2 = 1/4$ (-5, 1/4)
-4	$2^{-4+3} = 2^{-1} = ½$ (-4, ½)
-3	$2^{-3+3} = 2^0 = 1$ (-3, 1)
-2	$2^{-2+3} = 2$ (-2, 2)
-1	$2^{-1+3} = 2^2 = 4$ (-1, 4)

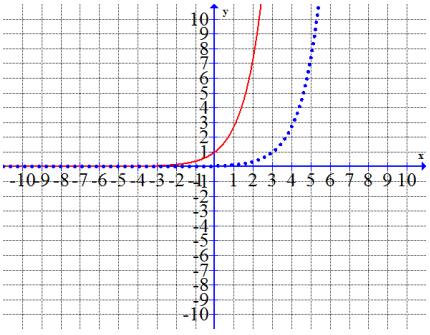


3b) domain $(-\infty, \infty)$ 3c) $range\ (0, \infty)$ 3d) y = 0

5a) $f(x-3) = e^{x-3}$

5b) The graph is the same, but shifted 3 units to the right.

5c) Graph of f(x – 3) drawn in blue.



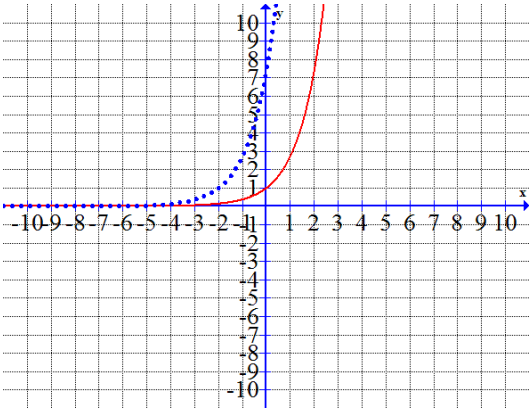
5d) domain $(-\infty, \infty)$ 5e) $range\ (0, \infty)$ 5f) y = 0

e) The graph is the same, but shifted 5 units to the right.

7a) $f(x+2) = e^{x+2}$

7b) The graph has the same shape, but is shifted 2 units to the left.

7c) Graph of f(x + 2) is drawn in blue.



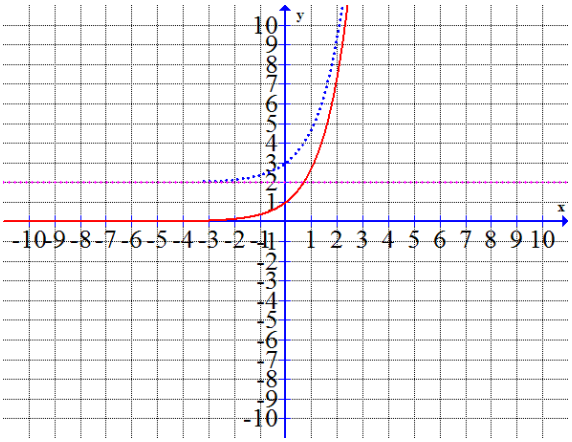
7d) domain $(-\infty, \infty)$ 7e) $range\ (0, \infty)$ 7f) y = 0

7e) The graph is the same, but shifted 4 units to the left.

9a) $f(x) + 2 = e^x + 2$

9b) Shift up 2 units.

9c) $f(x) + 2$ is drawn in blue, and the horizontal asymptote is drawn in purple.

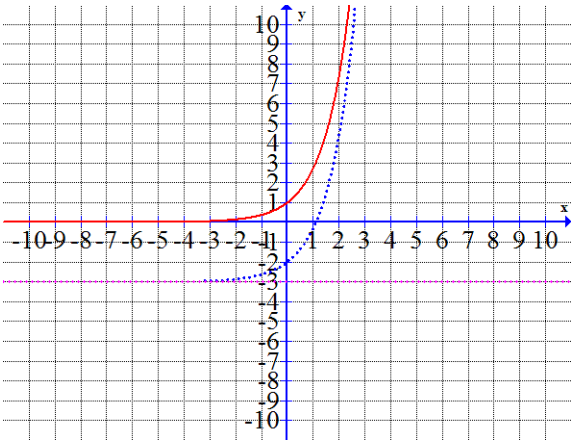


9d) domain $(-\infty, \infty)$ 9e) $range\ (2, \infty)$ 9f) $y = 2$

11a) $f(x) - 3 = e^x - 3$

11b) shifted down 3 units.

11c) graph of $f(x) - 3$ drawn in blue, horizontal asymptote drawn in purple.

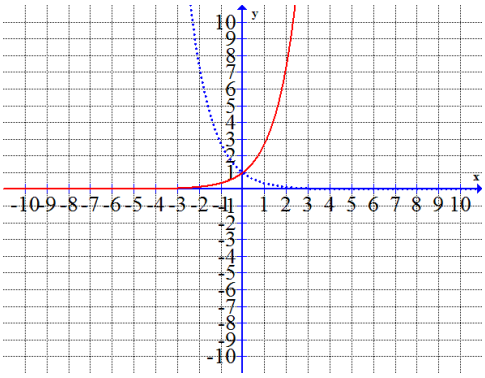


11d) domain $(-\infty, \infty)$ 11c) $range\ (-3, \infty)$ 11d) $y = -3$

13a) $f(-x) = e^{-x}$

13b) reflect over y-axis

13c) graph of f(-x) drawn in blue.

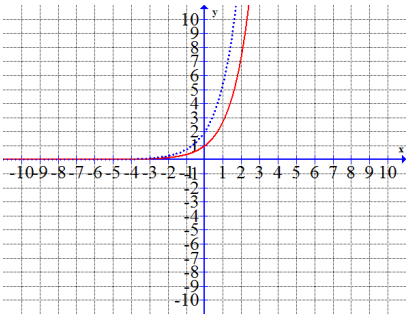


13d) domain $(-\infty, \infty)$ 13e) $range\ (0, \infty)$ 13f) y = 0

15a) $2f(x) = 2e^{x}$

15b) graph is stretched

15c) graph of 2f(x) drawn in blue.



Multiply each y in the original table of f(x) by 2 to get the y-values for the points in 2f(x)

x	f(x)	2f(x) y computation	Point on graph of 2f(x)
-2	$\frac{1}{e^2}$ = 0.14	2*0.14 = 0.28	(-2, 0.28)
-1	$\frac{1}{e}$ =0.37	2*0.37 = 0.74	(-1, 0.74)
0	1	2*1 = 2	(0, 2)
1	e = 2.72	2*2.72 = 5.44	(1, 5.44)
2	e^2 = 7.39	2*7.39 = 14.78	(2, 14.78)

15d) domain $(-\infty, \infty)$ 15e) $range\ (0, \infty)$ 15f) y = 0

17a) $g(x + 1) = 2^{x+1}$ 17b) shifts left 1

19a) $g(x – 1) = 2^{x-1}$ 19b) shifts right 1

21a) $g(x) + 1 = 2^x + 1$ 21b) shifts up 1

23a) $g(x) – 2 = 2^x – 2$ 23b) shifts down 2

25a) $–g(x) = -2^x$ 25b) reflects over x-axis

27a) $g(x + 1) – 4 = 2^{x+1} – 4$ 27b) shifts left 1 and down 4

29a) $g(x – 2) + 3 = 2^{x-2} + 3$ 29b) shifts right 2 and up 3

31a) $–g(-x) + 2 = -2^{-x} + 2$ 31b) reflects over x-axis, reflects over y-axis, shifts up 2

33) $x = 1$ 35) $x = -3$ 37) $x = 2$

39) $x = -5/2$ 41) $x = 2$ 43) $x = 10/3$

45) $x = -1$ 47) $x = -2$ 49) $x = 6$