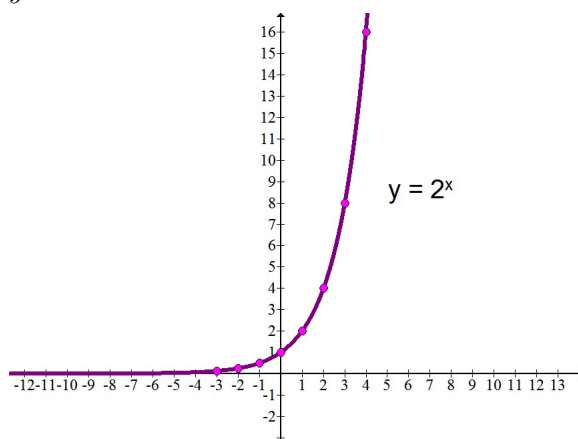


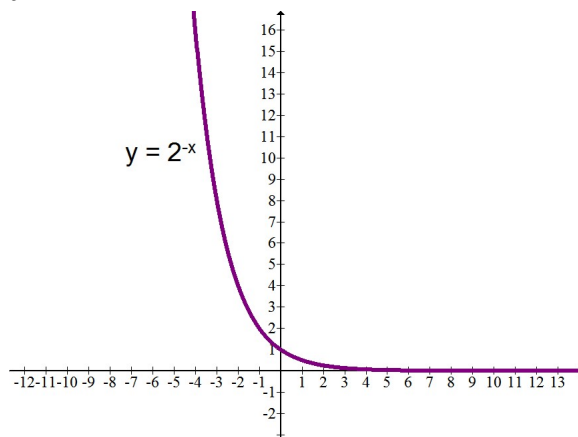
4.1 Exponential Functions

1. Sketch the graph. Label the intercepts and asymptotes.

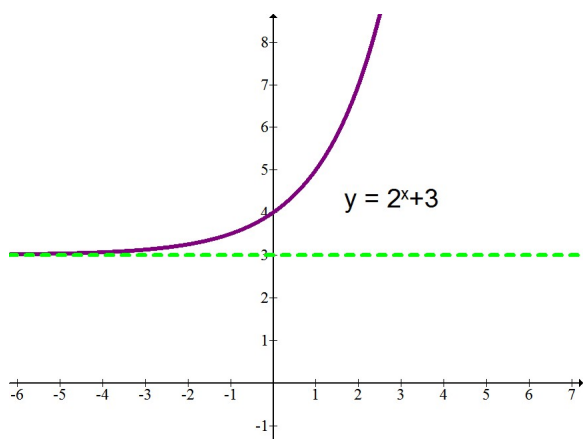
(a) $y = 2^x$



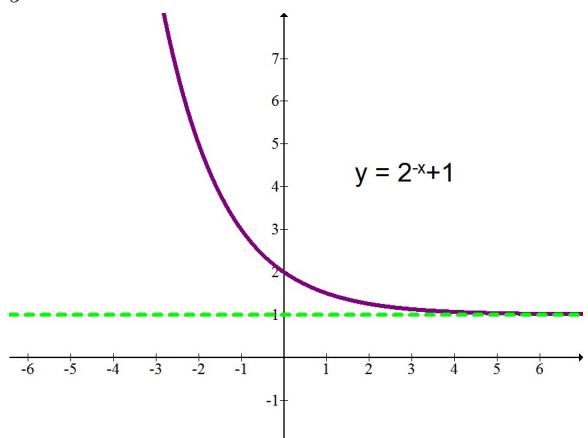
(b) $y = 2^{-x}$



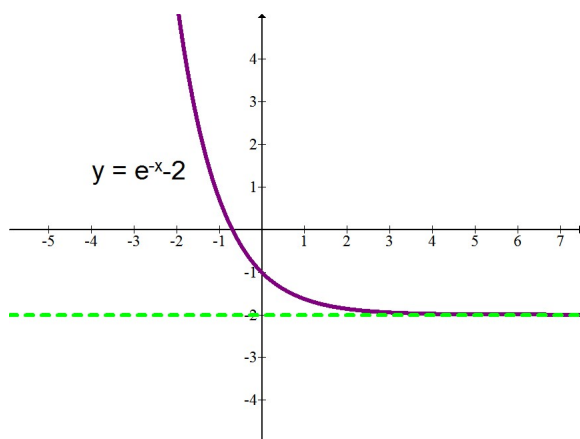
(c) $y = 2^x + 3$



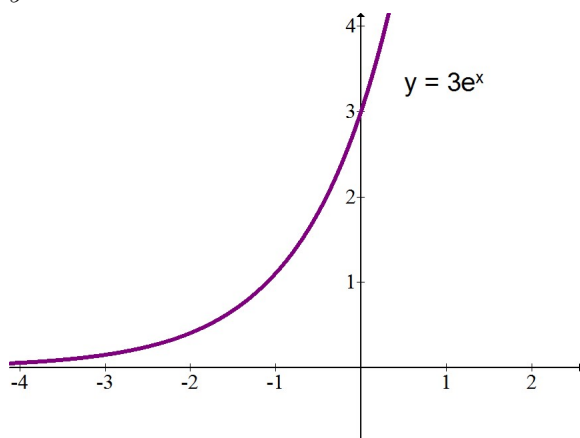
(d) $y = 2^{-x} + 1$



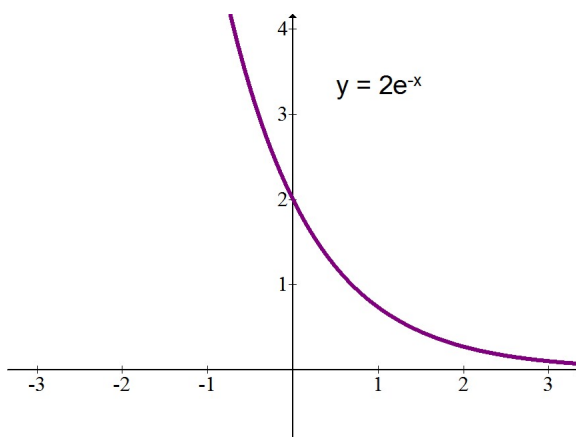
(e) $y = e^{-x} - 2$



(f) $y = 3e^x$



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



2. Solve each equation.

- (a) $2^x = 64$ SOLUTION $x = 6$
- (b) $10^x = 0.1$ SOLUTION $x = -1$
- (c) $3^x = 1/27$ SOLUTION $x = -3$
- (d) $3^{-x} = 9$ SOLUTION $x = -2$
- (e) $9^x = 3$ SOLUTION $x = 1/2$
- (f) $10^{x-1} = 0.01$ SOLUTION $x = -1$

3. A deposit of \$10,000 earns 6% annual interest. Find the amount in the account at the end of 5 years if the interest is compounded

(a) annually

SOLUTION $P = 10,000$, $r = 6\%$, $n = 2$, $t = 5$, find A .

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = 10000 \left(1 + \frac{.06}{2} \right)^{(2)(5)} \approx \$13,439.16$$

(b) quarterly

SOLUTION $P = 10,000$, $r = 6\%$, $n = 4$, $t = 5$, find A .

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 10000 \left(1 + \frac{.06}{4}\right)^{(4)(5)} \approx \$13468.55$$

(c) monthly

SOLUTION $P = 10,000$, $r = 6\%$, $n = 12$, $t = 5$, find A .

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 10000 \left(1 + \frac{.06}{12}\right)^{(12)(5)} \approx \$13488.50$$

(d) daily

SOLUTION $P = 10,000$, $r = 6\%$, $n = 365$, $t = 5$, find A .

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 10000 \left(1 + \frac{.06}{365}\right)^{(365)(5)} \approx \$13498.26$$

4. A deposit of \$2,000 is invested in Roth IRA account. Interest is compounded continuously. What will the value of the investment after 40 years if the annual interest rate is

(a) 3%

SOLUTION $P = 2,000$, $r = 3\%$, $t = 40$, find A .

$$A = Pe^{rt}$$

$$A = 2000e^{.03 \cdot 40} \approx \$6,640.23$$

(b) 5%

SOLUTION $P = 2,000$, $r = 5\%$, $t = 40$, find A .

$$A = Pe^{rt}$$

$$A = 2000e^{.05*40} \approx \$14,778.11$$

(c) 7% SOLUTION \$32,889.29

(d) 9% SOLUTION \$73,196.47