

1. For the following exercises, sketch the graph of the exponential function. Determine the domain, range, and horizontal asymptote.

(i) $f(x) = e^x + 2$

(ii) $f(x) = 1 - 2^{-x}$

(iii) $f(x) = 5^{x+1} + 2$

(iv) $f(x) = e^{-x} - 1$

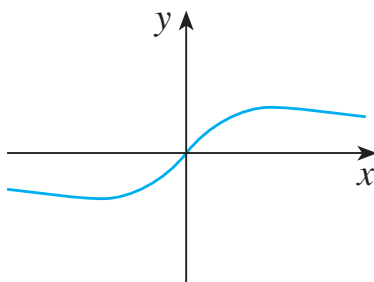
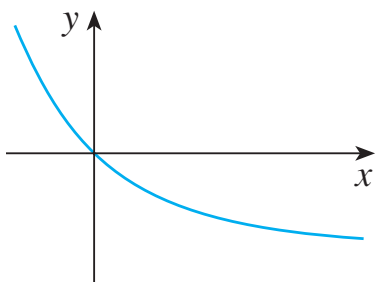
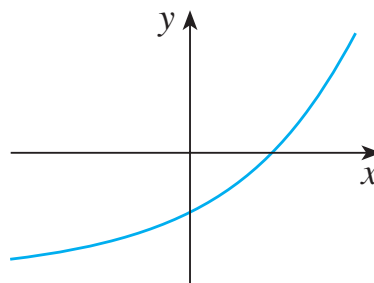
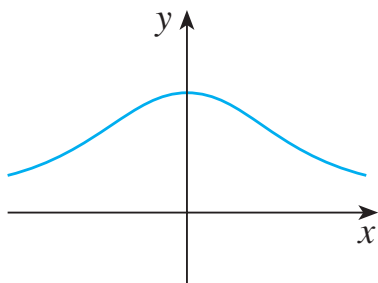
Definition A function f is called a **one-to-one function** if it never takes on the same value twice; that is,

$$f(x_1) \neq f(x_2) \quad \text{whenever } x_1 \neq x_2$$

Horizontal Line Test A function is one-to-one if and only if no horizontal line intersects its graph more than once.

2. Is the function $f(x) = x^3$ one-to-one?

3. A function is given by a graph. Determine whether it is one-to-one.



4. Let $0 \leq \theta < \pi/2$. Find $\sin 2\theta$ and $\cos 2\theta$ if $\tan \theta = \sqrt{2}$.

5. Find $\cos \theta$ if $\cot \theta = \frac{4}{3}$ and $\sin \theta < 0$.

6. Simplify the expression.

$$\frac{1 + \tan^2 \alpha}{1 + \cot^2 \alpha}$$

7. Verify that the following equation is an identity.

$$\sin^2 \beta + \tan^2 \beta + \cos^2 \beta = \sec^2 \beta$$

8. Solve the trigonometric equation on the interval $0 \leq \theta < 2\pi$.

$$1 + \cos \theta = \frac{1}{2}$$