

## Chapter 4.1 Check Your Understanding

*Draw a graph whenever it may be helpful.*

*Exercises 1–5 True or False. Give reasons.*

1. For every real number  $x$ ,  $\sqrt[3]{\sqrt{64x^6}} = 2x$ .

**Answer:**

False;  $\sqrt[3]{\sqrt{64x^6}} = |2x| = 2x$  only for nonnegative values of  $x$ .

2. For every real number  $x$ ,  $(x - 2)^0 = 1$ .

**Answer:**

False; when  $x = 0$ ,  $(x - 2)^0 = 0^0$  which is undefined.

3. For every negative number  $x$ ,  $\sqrt{(-x)^2} = -x$ .

**Answer:**

True;  $\sqrt{(-x)^2} = |x| = -x$  for every negative number  $x$ .

4.  $(-2)^{248} + (-1)^{215} > (-2)^{248}$ .

**Answer:**

False;  $(-1)^{215} = -1$ .

5. The function  $f(x) = 1 + 2^{-x}$  is increasing.

**Answer:**

False;  $2^{-x}$  gets smaller as  $x$  gets larger. It is also clear from the graph of  $f$ .

*Exercises 6–10 Fill in the blank so that the resulting statement is true.*

6. The number of zeros for  $f(x) = e^x - x - 2$  is \_\_\_\_\_.

**Answer:**

Draw a graph of  $f(x) = e^x - x - 2$  and see that there are two zeroes for  $f$ .

7. The number of roots of  $2^{-x} - x = 2$  is \_\_\_\_\_.

**Answer:**

One; it is clear by examining the graph that the only root is  $x \approx 2.2$ .

8. The graphs of  $y = e^{0.25x}$  and  $x + y = 2$  intersect at a point in Quadrant \_\_\_\_\_.

**Answer:**

Draw graphs of  $y_1 = e^{0.25x}$  and  $y_2 = 2 - x$  and see that they intersect in QI.

9. The graphs of  $y = e^{-x} - 2$  and  $x + y + 4 = 0$  intersect at a point in Quadrant \_\_\_\_\_.

**Answer:**

QIII; it is clear by graphing the two equations simultaneously that they intersect approximately at the point  $(-2.12, -1.88)$ .

10. The graphs of  $y = e^x + 2$  and  $y = 4 - x^2$  intersect in Quadrant(s) \_\_\_\_\_.

**Answer:**

Draw graphs of  $y_1 = e^x + 2$  and  $y = 4 - x^2$  and see that they intersect in QI and QII.