# Chapter 1.3 Check Your Understanding

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

**1.** If both $b$ and $d$ are negative real numbers, then $\sqrt{-b}\sqrt{-d} = \sqrt{bd}$.

**Answer:**

True; if $b < 0$, $d < 0$, then $-b > 0$, $-d > 0$ and $b \cdot d > 0$.

**2.** $|3 - \sqrt{10}| = \sqrt{10} - 3$.

**Answer:**

True; since $3 - \sqrt{10} < 0$, $|3 - \sqrt{10}| = -\left(3 - \sqrt{10}\right) = \sqrt{10} - 3$.

**3.** $1 - \sqrt{10} > 1 - \pi$

**Answer:**

False; since $1 - \sqrt{10} \approx -2.16$ and $1 - \pi \approx -2.14$, and $-2.16 < -2.14$.

**4.** In the complex plane, $3 + 4i$ is farther from the origin than $5i$.

**Answer:**

False; $|3 + 4i| = \sqrt{9 + 16} = 5$, $|5i| = \sqrt{25} = 5$. Thus $3 + 4i$ and $5i$ are the same distance from the origin.

**5.** If $0 < b < 1$ and $-1 < c < 0$, then $-1 < b - c < 1$.

**Answer:**

False; try $b = 0.8$ and $c = -0.7$. Then $b - c = 0.8 - (-0.7) = 1.5$.

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

**6.** The smallest integer that is greater than $3 - \sqrt{10}$ is _____.

**Answer:**

$3 - \sqrt{10} \approx -0.16$; the smallest integer greater than $-0.16$ is 0.

**7.** The greatest integer less than $\frac{3-\pi}{4}$ is _____.

**Answer:**

$-1$; $\frac{3-\pi}{4} \approx -0.035$.

**8.** The largest integer in the set $\{x \mid -\sqrt{3} < x < \sqrt{148}\}$ is _____.

**Answer:**

$-\sqrt{3} \approx -1.73$, $\sqrt{148} \approx 12.17$; the largest integer less than 12.17 is 12.

**9.** The number of integers between $\sqrt{29} + 1$ and $8\pi$ is _____.

**Answer:**

19; $\sqrt{29} + 1 \approx 6.4$ and $8\pi \approx 25.1$, integers between are 7, 8, 9, . . . , 25.

**10.** The number of prime numbers between $\sqrt{17} - 2$ and $\sqrt{83} + 8$ is _____.

**Answer:**

$\sqrt{17} - 2 \approx 2.1$, $\sqrt{83} + 8 \approx 17.1$; the prime numbers between 2.1 and 17.1 are 3, 5, 7, 11, 13, and 17.