

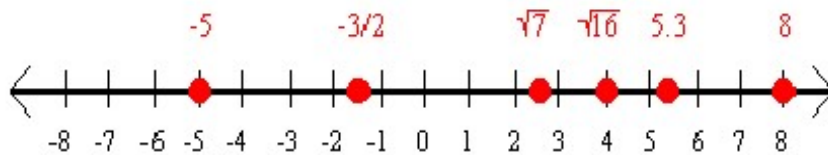
1. Consider the following list of numbers.

$$-5, \sqrt{16}, -\frac{3}{2}, \sqrt{7}, 5.3, 8$$

(a) List all of these that are integers.

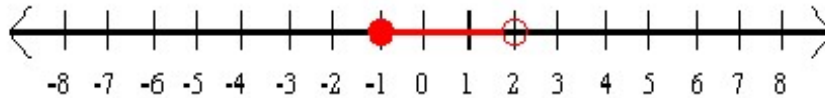
$$-5, \sqrt{16}, 8$$

(b) Place each number on the number line below.

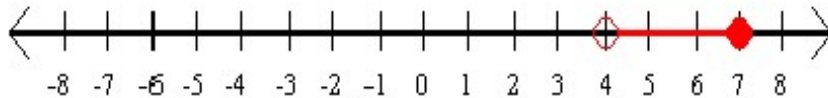


2. Clearly sketch each of the following on a number line.

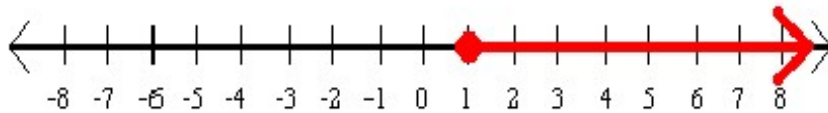
(a) $-1 \leq x < 2$



(b) $(4, 7]$



(c) x is at least 1.



3. Circle all of the expressions below that are not real numbers.

$$\sqrt{5}, -\sqrt{4}, \boxed{\sqrt{-4}}, \sqrt[3]{8}, \sqrt[3]{-8}, \frac{15}{4}, \boxed{\frac{6}{0}}, \frac{0}{7}, \sqrt{0}, \boxed{0^{-1}}$$

4. Simplify each expression as much as possible.

(a) $|4 - 7|$

$$|4 - 7| = |-3| = 3$$

(b) $|2| - |-3|$

$$|2| - |-3| = 2 - 3 = -1$$

5. Simplify each expression as much as possible. Leave no negative exponents in your answer.

(a) $(-4)^2 \cdot 2^{-2}$

$$(-4)^2 \cdot 2^{-2} = 16 \cdot \frac{1}{2^2} = 16 \cdot \frac{1}{4} = \frac{16}{4} = 4$$

(b) $\sqrt[3]{16} + 4\sqrt[3]{54}$

$$\begin{aligned}\sqrt[3]{16} + 4\sqrt[3]{54} &= \sqrt[3]{2^3 \cdot 2} + 4\sqrt[3]{3^3 \cdot 2} \\ &= 2\sqrt[3]{2} + 4 \cdot 3\sqrt[3]{2} \\ &= 2\sqrt[3]{2} + 12\sqrt[3]{2} \\ &= 14\sqrt[3]{2}\end{aligned}$$

6. Simplify each expression as much as possible. Leave no negative exponents in your answer.

(a) $(\sqrt[3]{4})^2 \sqrt[3]{4}$

$$(\sqrt[3]{4})^3 = 4$$

(b) $\left(\frac{2x^{-1}}{3y}\right)^{-2}$

$$\left(\frac{2x^{-1}}{3y}\right)^{-2} = \frac{2^{-2}x^2}{3^{-2}y^{-2}} = \frac{3^2x^2y^2}{2^2} = \frac{9x^2y^2}{4}$$

7. Perform the indicated operation and write your answer as a polynomial in standard form.

(a) $(5x^5 - 4x^3 + 2x - 4) - (6x^4 + 2x + 7)$

$$(5x^5 - 4x^3 + 2x - 4) - (6x^4 + 2x + 7) = 5x^5 - 6x^4 - 4x^3 - 11$$

(b) $(x^4 - 2x)(x + 5)$

$$(x^4 - 2x)(x + 5) = x^5 + 5x^4 - 2x^2 - 10x$$

8. Factor each expression.

(a) $4x^2 - 81$

$$4x^2 - 81 = (2x - 9)(2x + 9)$$

(b) $x^3 + 1$

$$x^3 + 1 = (x + 1)(x^2 - x + 1)$$

9. Factor each expression.

(a) $x^2 - 6x + 5$

$$x^2 - 6x + 5 = (x - 5)(x - 1)$$

(b) $4x^2 + 10x - 6$

$$\begin{aligned} 4x^2 + 10x - 6 &= 2(2x^2 + 5x - 3) \\ &= 2(2x - 1)(x + 3) \end{aligned}$$

10. Simplify each expression as much as possible.

(a) $\frac{(x+2)^2}{x^2+6x+8}$

$$\frac{(x+2)^2}{x^2+6x+8} = \frac{(x+2)^2}{(x+4)(x+2)} = \frac{x+2}{x+4}, x \neq -2$$

(b) $\frac{x-2}{x} \cdot \frac{x^3}{x^2-2x}$

$$\begin{aligned} \frac{x-2}{x} \cdot \frac{x^3}{x^2-2x} &= \frac{x-2}{x} \cdot \frac{x^3}{x(x-2)} \\ &= \frac{(x-2)x^3}{x^2(x-2)} \\ &= x \end{aligned}$$