

1. Simplify each of the following expressions. If the answer is a fraction, reduce it to lowest terms.

$$(a) \frac{\frac{1}{5} - \frac{1}{6}}{\frac{1}{4} - \frac{1}{24}} = \frac{\frac{2}{24} - \frac{1}{24}}{\frac{6}{24} - \frac{2}{24}} = \frac{\frac{1}{24}}{\frac{4}{24}} = \frac{1}{2} \cdot \frac{24}{14} = \frac{2 \cdot 12}{2 \cdot 14} = \frac{12}{14} = \frac{6}{7}$$

$$(b) |-2 - 7| - |3 - 9| = |-9| - |-6| = 9 - 6 = 3$$

2. Consider the following sets:

$$A = \{x | -1 \leq x \leq 11\}$$

$$B = \{x | x > 3\}$$

- (a) Sketch the graph of the intersection of  $A$  and  $B$ .

- (b) Write in interval notation  $A \cup B$ .

$$[-1, \infty)$$

3. (a) Write .00000345 in scientific notation.  $3.45 \times 10^{-6}$

- (b) Write  $8.65 \times 10^{-4}$  in decimal notation. 0.000865

4. Simplify the following:

$$(a) -4^2 = -(4^2) = -16$$

$$(b) (r^2s)^3(3r^3s^2) = (r^6s^3)(3r^3s^2) = 3r^6r^3s^3s^2 = 3r^9s^5$$

$$(c) (16)^{3/2} = \sqrt{16^3} = (\sqrt{16})^3(\sqrt{4 \cdot 4})^3 = 4^3 = 64$$

$$(d) 6^{1/2}(12^{1/2}) = (6 \cdot 2 \cdot 6)^{1/2} = \sqrt{6 \cdot 6 \cdot 2} = 6\sqrt{2}$$

$$(e) \frac{\sqrt{24}}{\sqrt{2}} = \sqrt{\frac{24}{2}} = \sqrt{12} = \sqrt{4 \cdot 3} = \sqrt{2 \cdot 2 \cdot 3} = 2\sqrt{3}$$

5. (a) Simplify the expression  $\sqrt[5]{a^3b}\sqrt[5]{a^2b^3}$

$$\sqrt[5]{a^3b}\sqrt[5]{a^2b^3} = \sqrt[5]{a^3a^2bb^3} = \sqrt[5]{a^5b^4} = a\sqrt[5]{b^4}$$

- (b) Rationalize the denominator  $\frac{4}{\sqrt[5]{x^3}}$

$$\frac{4}{\sqrt[5]{x^3}} = \frac{4}{\sqrt[5]{x^3}} \cdot \frac{\sqrt[5]{x^2}}{\sqrt[5]{x^2}} = \frac{2\sqrt[5]{x^2}}{\sqrt[5]{x^3x^2}} = \frac{2\sqrt[5]{x^2}}{\sqrt[5]{x^5}} = \frac{2\sqrt[5]{x^2}}{x}$$