I. Section 1.1.

1. Let \( A = \{-3, 0, 1, \pi, 4\} \), \( B = \{-7, -3, 0, \frac{7}{3}\} \) and \( C = \{1, 3.14, 12\} \). Find:
   
   (a) \( A \cup B \)
   
   (b) \( A \cap B \)
   
   (c) \( A \cap C \)
   
   (d) \( B \cap C \)

2. Let \( A = \{x : x \leq \frac{1}{2}\} \), \( B = \{x : -1 < x \leq \sqrt{2}\} \) and \( C = \{x : 0 < x < 1\} \).
   
   (a) Write \( A \), \( B \) and \( C \) using interval notation. Graph each set on a number line.

   (b) Find the following. Write your answers in interval notation.
      
      (i) \( A \cap B \)
      
      (ii) \( A \cup C \)

III. Section 1.2.

1. Evaluate the following:
   
   (a) \(-2^4\)
   
   (b) \((-2)^4\)
   
   (c) \((-2)^{-3}\)
2. Simplify the following using properties of exponents. It’s OK to leave negative exponents in your answers.
   (a) \(-(-3x^4)^2\)
   
   (b) \((x^4y^2) \cdot (x^2y^{-1})^3\)
   
   (c) \(\frac{x^8y^2}{x^4y^{-4}}\)
   
   (d) \(\frac{(xy^2z^{-4})^3}{(x^{-2}y^4z^2)^{-2}}\)

3. Find the following (if they exist).
   (a) \(\sqrt{25}\)
   
   (b) \(\sqrt{-25}\)
   
   (c) \(\sqrt[3]{-8}\)
   
   (d) \(\sqrt{0}\)
   
   (e) \(\sqrt[3]{0}\)

4. Simplify the following:
   (a) \(\sqrt{24}\)
   
   (b) \(\sqrt{45}\)
   
   (c) \(\sqrt[3]{20} \cdot \sqrt{5}\)

5. Is \(\sqrt{9} + \sqrt{16} = \sqrt{25}\)?