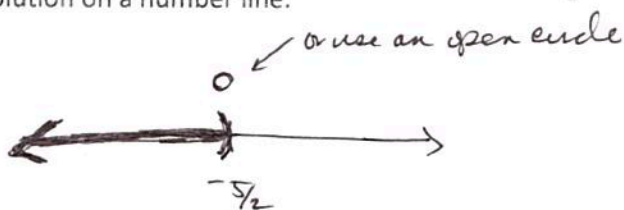**Instructions:** Show all work. Partial credit can only be given where work is shown. Be sure to answer all parts of each question. You may not use a calculator on this quiz.

1. Solve the inequality $\frac{1}{6}x < -\frac{5}{12}$. Draw the solution on a number line.

   $\times 12$

   $2x < -5$

   $x < -\frac{5}{2}$

   or use an open circle

2. Consider the following set:

   $$\left\{ 9, -0.25, \underset{-\frac{1}{4}}{\frac{\sqrt{2}}{\pi}}, -1, |-23|, -\sqrt{\underset{23}{\frac{81}{16}}}, .301.001000100001..., \overset{3}{\frac{39}{13}}, \frac{47}{5}, \sqrt{\pi e}, \overset{16}{(-4)^2} \right\}$$

   Using correct set notation, give the elements that also belong to each of the following sets.

   a. The Natural Numbers

   $9, \ |-23| = 23, \ (-4)^2 = 16, \ \frac{39}{13} = 3$ $\{3, 9, 23, 16\} \in \mathbb{N}$

   b. The Rational Numbers

   $\left\{ 9, -\frac{1}{4}, -1, 23, -\frac{9}{4}, 3, \frac{47}{5}, 16 \right\} \in \mathbb{Q}$

   c. The Irrational Numbers

   $\left\{ \frac{\sqrt{2}}{\pi}, \ .301.001000100001..., \ \sqrt{\pi e} \right\} \in \mathbb{I}$

   d. Integers

   $\{ 9, -1, 23, 3, 16 \} \in \mathbb{Z}$

3. Compute and simplify

   a. $\sqrt{18} \times \sqrt{32}$

   $3\sqrt{2} \times 4\sqrt{2}$

   $12\sqrt{4} = 12 \cdot 2 = 24$

   b. $\frac{\sqrt{96}}{\sqrt{6}} = \sqrt{\frac{96}{6}} = \sqrt{16} = 4$

4. Express the value $(-32)^{3/5}$ without exponents.

   $\left(\sqrt[5]{-32} \right)^3 = (-2)^3 = -8$

5. Solve the inequality $\frac{3}{2}x - 2 < \frac{5}{6}x + \frac{1}{3}$. Draw the solution on a number line.

   $\times 6$

   $9x - 12 < 5x + 2$
   $\underline{-5x \qquad\quad -5x}$

   $4x - 12 < +2$
   $\underline{+14 \qquad 14}$

   $4x < 14$

   $x < \frac{7}{2}$