Name _____   Sec. no. _____

Do all work in the space provided within each question group. No calculator use. *Reduce all answers to lowest terms when appropriate.*

1. a) Express the set of real numbers $\mathbb{R}$ as the *union* of two subsets (give symbols and names):

    b) Circle all the *irrational* numbers in the list below:

    $$\frac{4}{\sqrt{3}} \qquad 0.6\overline{23} \qquad \pi + 1 \qquad -4.111\ldots \qquad 0 \qquad \left| -\pi \right|$$

    c) Give an example of two *composite* numbers that are *relatively prime*:

    d) The fraction $4\dfrac{5}{9}$ is equivalent to the decimal _____ and the percentage _____.

2. Perform the operations and give the answer in lowest terms:

    a) $11\frac{1}{4} - 5\frac{1}{2}$

    b) $12\dfrac{1}{4} \cdot 5\dfrac{3}{7}$

    c) $\dfrac{\frac{6}{11}}{\frac{1}{33}}$

3. a) Graph the absolute value equality and inequalities on the number line:

$|x| = 7\frac{1}{2}$ _____

$|x| > 3$ _____

$|x| \leq 8$ _____

4. Evaluate the following, expressing the answer in simplest form:

a) $\dfrac{|7-23|+|8-12|}{-|-2|}$

b) $-3^2 + \sqrt{121} - 4 - (-18) - (5-3)^{-1}$

c) $\sqrt[3]{a} + b^{-1} + \dfrac{5}{c}$, when $a = -64,\ b = 1/10,\ c = 0.1$

5. Reduce each expression to its simplest form, leaving no negative exponents:

a) $\dfrac{y-2}{2-y} \cdot \dfrac{x+2}{x-2}$

b) $\dfrac{570x^2 y}{190xy^6}$

c) $\left(\dfrac{81x^{-4}y^3}{25x^6 y^{-9}} \right)^{-1/2}$

6. Simplify each radical expression:

a) $\sqrt{72x^8 y^7}$

b) $\sqrt[3]{-27x^4 y^{11}}$

c) $\sqrt{200} - 3\sqrt{32} + \sqrt{1000} - 5\sqrt{2}$

d) $\sqrt[5]{-\dfrac{32}{243}}$

e) $\dfrac{5x}{\sqrt{10}}$ (rationalize the denominator)

7. Rewrite each false statement to make it true:

a) $\left(\dfrac{y}{7}\right)^{-1} = \dfrac{-1}{7y}$

b) $-\left(\dfrac{m}{n}\right) = \dfrac{-m}{-n}$

c) $\sqrt[n]{a^m} = \left(a^n\right)^{\frac{1}{m}}$

d) $\sqrt{1} + \sqrt{25} = \sqrt{26}$

e) $\left(\dfrac{1}{a} - \dfrac{1}{b}\right)^{-1} = a - b$

f) $|x + y| \geq |x| + |y|$