SN _____ ID _____ NAME _____

Show all necessary steps for full marks.

Question 1: (8 points): Given the following numbers:

$$-1,\ \frac{0}{\pi},\ 1,\ 2,\ 5,\ 91,\ 2.12122123...,\ \frac{22}{7},\ -41,\ 2.2\overline{3},\ \pi,\ \frac{\sqrt{2}}{3},\ \sqrt{\frac{27}{3}},\ 3.14,\ \frac{12.1}{1.1}$$

Complete the following:

Integers: _____

Rational Numbers: _____

Irrational Numbers: _____

Solution:

Integers: $-1,\ \frac{0}{\pi},\ 1,\ 2,\ 5,\ 91,\ -41,\ \sqrt{\frac{27}{3}},\ \frac{12.1}{1.1}$

Rational Numbers: $-1,\ \frac{0}{\pi},\ 1,\ 2,\ 5,\ 91,\ \frac{22}{7},\ -41,\ 2.2\overline{3},\ \sqrt{\frac{27}{3}},\ 3.14,\ \frac{12.1}{1.1}$

Irrational Numbers: $2.12122123...,\ \pi,\ \frac{\sqrt{2}}{3}$

Question 2: (12 points): Answer the following:

A. Which is smaller $\frac{8}{11}$ or $\frac{7}{9}$? Why?

Answer: $\frac{8}{11}$ because $\frac{8}{11}=\frac{8(9)}{11(9)}=\frac{72}{99}$ and $\frac{7}{9}=\frac{7(11)}{9(11)}=\frac{77}{99}$

B. Express $\frac{115}{40}$ and $\frac{147}{28}$ as a decimal numbers.

$$\begin{array}{r} 2.875 \\ 40\overline{)\ 115} \\ \underline{80} \\ 350 \\ \underline{320} \\ 300 \\ \underline{280} \\ 200 \\ \underline{200} \\ 0 \end{array} \qquad \begin{array}{r} 5.25 \\ 28\overline{)\ 147} \\ \underline{140} \\ 70 \\ \underline{56} \\ 140 \\ \underline{140} \\ 0 \end{array}$$

Answer: $\frac{115}{40}=2.875$ and $\frac{147}{28}=5.25$

C. Express 0.62 as a fraction in its lowest terms.

Answer: $0.62=\frac{31}{50}$ because $0.62=\frac{0.62}{1}=\frac{62}{100}=\frac{2(31)}{2(50)}=\frac{31}{50}$

D. Find reciprocal of the mixed number $-2\frac{3}{5}$

Answer: $-\frac{5}{13}$ because $-2\frac{3}{5}=-\left(2\frac{3}{5}\right)=-\left(2+\frac{3}{5}\right)=-\frac{13}{5}$

Question 3: (5 points): If $0 < x < 1$, then $\left|5+x\right| + \left|\dfrac{-2x+2}{\left|x+\left|x-2\right|\right|}\right| = ?$

A) 6
B) $2x+4$
C) 4
D) $3x+7$
E) $2x-6$

Solution:

18) If $0 < x < 1$, then $\left|5+x\right| + \left|\dfrac{-2x+2}{\left|x\right|+\left|x-2\right|}\right| =$

A) 6
B) $2x+4$
C) 4
D) $3x+7$
E) $2x-6$

For $0 < x < 1$, $5+x > 0 \Rightarrow |5+x| = 5+x$,

$x > 0 \Rightarrow |x| = x$, and $x-2 < 0 \Rightarrow |x-2| = 2-x$

Therefore:

$$\left|5+x\right| + \left|\frac{-2x+2}{|x|+|x-2|}\right| = (5+x) + \left|\frac{-2x+2}{x+2-x}\right|$$

$$= (5+x) + \left|\frac{2-2x}{2}\right| = (5+x) + |1-x|$$

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