NAME: SOLUTIONS

**MATH 002 EXAM 1 (FORM B)**

**1) (0.5pts each)** In each row place a check mark in each column that is appropriate

| | $\mathbb{N}$ | W | $\mathbb{Z}$ | $\mathbb{Q}$ | IH | $\mathbb{R}$ | Not a real number |
|---|---|---|---|---|---|---|---|
| 6 | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| $\frac{-15}{3} = -5$ | | | ✓ | ✓ | | ✓ | |
| $-\frac{\pi}{\pi} = -1$ | | | ✓ | ✓ | | ✓ | |
| $\sqrt{0} = 0$ | | ✓ | ✓ | ✓ | | ✓ | |
| 0.25 | | | | ✓ | | ✓ | |
| $\sqrt{25}-\sqrt{16}$ $5-4=1$ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| $\sqrt{-3}$ not real # | | | | | | | ✓ |
| $2\pi$ | | | | . | ✓ | ✓ | |
| $\frac{0}{7} = 0$ | | ✓ | ✓ | ✓ | | ✓ | |

**2) (1.5pts each)** Name the property of real numbers that has been used to re-write the expression. (Like commutative property of addition etc.)

a) $\frac{3}{2-x}+\left(-\frac{3}{2-x}\right)=0$ Additive Inverse

b) $(5-x)(3+y)=5(3+y)-x(3+y)$ Distribution of Mult. over Addition.

c) $(x+y)+(x-y)=(x-y)+(x+y)$ Comm. of Addition.

d) $(7+y)\cdot 1=7+y$ Multiplicative Identity.

e) $5-x=-x+5=(-1)(x+(-5))$ There are two properties here name them both.

Comm of Addition. Dist of Mult. over Addition.

**3) (5pts each)** Simplify the expression

a) $\frac{4}{9}\left(\frac{27}{8}y-\frac{18}{12}z-\frac{9}{40}\right) = \frac{4}{9}\cdot\frac{27}{8}y-\frac{4}{9}\cdot\frac{18}{12}z-\frac{4}{9}\cdot\frac{9}{40}$

$= \boxed{\frac{3}{2}y-\frac{2}{3}z-\frac{1}{10}}$

b) $-\frac{1}{4}(20m+8n-32) = -\frac{1}{4}\cdot\frac{20m}{1}+\left(-\frac{1}{4}\right)\cdot\frac{8n}{1}-\left(\frac{-1}{4}\right)\frac{32}{1}$

$= \boxed{-5m-2n+8}$

c) $\left(\frac{3r}{4}\right)(-12) = \boxed{-9r}$

d) $\frac{1}{3}\div\frac{1}{12}+\frac{1}{15} = \frac{1}{3}\cdot\frac{12}{1}+\frac{1}{15} = \frac{4}{1}+\frac{1}{15} = \frac{60}{15}+\frac{1}{15} = \boxed{\frac{61}{15}}$

CD=15

e) $\frac{2}{3}-13\left(\frac{1}{13}-\frac{1}{39}\right)$ (Distribute) $= \frac{2}{3}-\left(\frac{13}{13}-\frac{13}{39}\right)$

$= \frac{2}{3}-\left(1-\frac{1}{3}\right)$

$= \frac{2}{3}-\left(\frac{3}{3}-\frac{1}{3}\right)$

$= \frac{2}{3}-\frac{2}{3} = \boxed{0}$

**4) (5pts each)** Evaluate each expression

a) $-4(9-8)+(-7)(2)^3$ $= -4(1)+(-7)8$

$= -4 - 56 = \boxed{-60}$

b) $(-3^2-(-2))(\sqrt{16}-2^3)$ $= (-9+2)(4-8)$

$= (-7)\cdot(-4) = \boxed{28}$

c) $\left(-\frac{5}{8}-\left(-\frac{2}{5}\right)\right)-\left[\frac{3}{2}-\frac{11}{10}\right]$ $= \left(-\frac{5}{8}+\frac{2}{5}\right)-\left[\frac{3}{2}-\frac{11}{10}\right]$

CD = 40 CD = 20

$= \left(\frac{-25}{40}+\frac{16}{40}\right)-\left[\frac{30}{20}-\frac{22}{20}\right]$

$= -\frac{9}{40}-\frac{8}{20} = \frac{-9}{40}-\frac{16}{40} = \frac{-25}{40} = \boxed{\frac{-5}{8}}$

d) $\frac{15\div5\cdot4\div6-8}{-6-(-5)-8\div2}$ $= \frac{3\cdot4\div6-8}{-6+5-4} = \frac{12\div6-8}{-1-4} = \frac{2-8}{-5} = \frac{-6}{-5} = \boxed{\frac{6}{5}}$

**5) (5pts each)** Evaluate each expression if $p=-4, q=8$ and $r=-10$

a) $2p-7q+r^2 = 2(-4)-7(8)+(-10)^2$

$= -8-56+100 = \boxed{36}$

b) $\frac{3q}{r}-\frac{5}{p} = \frac{3(8)}{-10}-\frac{5}{-4} = -\frac{24}{10}-\left(-\frac{5}{4}\right) = -\frac{12}{5}+\frac{5}{4}$

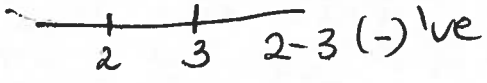
$= \frac{-48+25}{20} = \boxed{\frac{-23}{20}}$

**6) (5pts each)** Re-write the following absolute value expressions without an absolute value sign.

a) $|-8|-|-6| = 8-6 = \boxed{2}$

b) $|\sqrt{14}-\sqrt{7}| = \boxed{\sqrt{14}-\sqrt{7}}$

c) $|x-3|$ if $x<3$ (−)'ve




$|x-3| = \boxed{-(x-3)} = \boxed{-x+3}$

**7) (5pts each)** Evaluate the following absolute value expressions if $x=-4$ and $y=3$

a) $\frac{|x|+2y}{|5|+x} = \frac{|-4|+2(3)}{5+(-4)} = \frac{4+6}{5-4} = \frac{10}{1} = \boxed{10}$

b) $|-5y+x| = |-5(3)+(-4)| = |-15-4| = |-19| = \boxed{19}$

**8) (1pt each)** Mark the following statements as True or False. In case you claim they are false either explain why or give an example.

a) $\frac{|-8|}{|2|} = \left|\frac{-8}{2}\right|$ TRUE

b) $(-2)^5 = -2^5$ TRUE $-2^5 = (-1)2^5 = (-1)32 = -32$
$(-2)^5 = -32$ ← same.

c) $\pi = 3.14$ so π is rational number. FALSE
π is approximately not exactly 3.14

d) There are rational numbers that are not integers.
TRUE 1.37 is rational not integer.

e) Rational numbers are also called real numbers. Rational #'s are part of real #'s.

f) 0 is the multiplicative identity
FALSE 1 is the multiplicative identity.

g) To divide two fractions you need a common denominator.
FALSE only when you add/subtract you need them.

h) $\frac{x-5}{5+x} = \frac{x}{x} = 1$ FALSE Say $x = 1$ $\frac{1-5}{5+1} = -\frac{4}{6} = -\frac{2}{3}$ not 1

i) The multiplicative inverse of $\frac{\sqrt{2}}{5}$ is $-\frac{5}{\sqrt{2}}$ FALSE

$\frac{\sqrt{2}}{5} \cdot \frac{5}{\sqrt{2}} = 1$

not (-) ive $5/\sqrt{2}$

**Extra Credit (2pts)** Is there a commutative property for division? That is, in general is a÷b equal to b÷a? Support your answer with an example.

No there is not.

Say $a = 10 \quad b = 5$

$\frac{a}{b} = \frac{10}{5} = 2$ but $\frac{b}{a} = \frac{5}{10} = \frac{1}{2}$

not equal.