med = 79.

Key 20/20

Math 310 - Dr. Miller - Exam #1 - 2/16/09

Set all cell phones to off or silent - no vibrating.

1. *[8 pts]* Explain why the fraction $\frac{5}{0}$ makes no sense, referring to one of the "part-of" meanings of a fraction. (1 or 2 sentences)

Part-of-a-whole: you can't cut a whole object into 0 pieces.

(-1) brief wording
(-2) very different wording with 5 out of 0 idea.
(-4) 0 ÷ 5 only

Part-of-a-group: You can't keep 5 out of any 0 objects.

(-2) 0 ÷ 5 idea + right "0 is the whole."
(-1) "0 is the whole."

2. *[12 pts]* If 2 orange Fraction Tiles represent the fraction $\frac{8}{3}$, how could you represent the fraction $\frac{1}{2}$? Clearly explain your reasoning.

(3)

2 orange = 8 pink, so each pink is $\frac{1}{3}$.

(7)
(9) to here.

3 pink = 1 whole

Cover the whole with 2 green + keep 1.

(-2) estimating 1/2 of 1 pink.

(-8) $\frac{1}{2}$ of $\frac{8}{3}$ = (2 blue)

1 green = $\frac{1}{2}$

$\frac{24}{24}$

3. *[10 pts]* Find a fraction that is equivalent to $\frac{15}{8}$, and for which the sum of numerator and denominator is 368. Show scratch work, but you need not explain.

-4 denom = 368

$\frac{15}{8} \cdot \frac{20}{20} = \frac{300}{160}$ > 460 too big

-10 no FLF

FLF

$\frac{15}{8} \cdot \frac{15}{15} = \frac{225}{120}$ > 345 too small

$\frac{15}{8} \cdot \frac{16}{16} = \frac{240}{128}$ > 368 is right.

$\boxed{\frac{240}{128}}$

4. Consider the fractions $\frac{30}{41}$ and $\frac{3}{4}$.

(a) *[10 pts]* Demonstrate two different techniques for determining which of these fractions is larger.

FLF

$\frac{30}{41}$ vs. $\frac{30}{40}$ Both keep 30 pieces, but 40ths are fatter, so $\boxed{\frac{3}{4} \text{ is larger.}}$

-5 show diagram; "close to 1"

-2 40ths are fatter. DONE

-3 conflicting N+D.

FLF

$\frac{30}{41} \times \frac{3}{4}$

$\frac{30}{41} \cdot \frac{4}{4} = \frac{120}{164}$

-1 stop rule. → $120 < 123$

so $\boxed{\frac{3}{4} \text{ is larger}}$

$\frac{3}{4} \cdot \frac{41}{41} = \frac{123}{164}$

$\boxed{\frac{3}{4} \text{ is larger}}$

(b) *[4 pts]* Demonstrate any technique for finding a fraction between these two.

$\frac{120}{164}$ vs. $\frac{123}{164}$ has $\boxed{\frac{121}{164}, \frac{122}{164}, \frac{123}{164} \text{ between}}$

So is $\frac{30+3}{41+4} = \boxed{\frac{33}{45}}$

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5. *[6 pts]* Explain why a common denominator is necessary for adding and subtracting fractions. (1 or 2 sentences)

(-6) not CD gives wrong answer
(-3) "name" w/o reference to whole.

The whole(s) must be separated into same-size pieces to name the answer as a fraction.

6. *[8 pts]* Subtract entirely in mixed number notation: $7\frac{1}{3} - 2\frac{3}{4}$. Show clear work.

(-8) not mixed numbers
(-6) $\frac{4}{12} \to \frac{14}{12}$.

$7\frac{1}{3}$
$-2\frac{3}{4}$

$6\ \ 16$
$\cancel{7}\ \cancel{4}/12$
$-\ 2\ 9/12$

$4\ 7/12$

$\frac{1}{3} \to \frac{4}{12}$ (FLF)

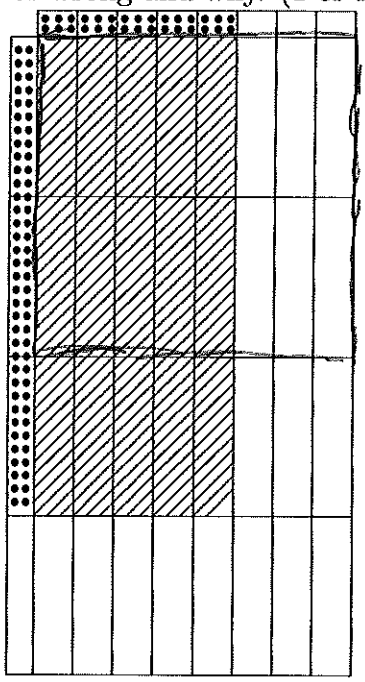
7. *[6 pts]* Write the number of one problem among Problems #1-6 on this exam in which you used the Fundamental Law of Fractions. Then write and circle the initials "FLF" next to where you applied it **in that problem**.

(-6) not $\cdot \frac{n}{n}$.

#3, 4, or 6

8. *[8 pts]* Daphne drew the following diagram to compute $\frac{5}{8} \times \frac{3}{2}$. She claims that her picture shows that the denominator of the product should be 32. Explain whether she is right or wrong and why. (1 or 2 sentences)

(-5) 24
(-8) "she's right"



She's ~~who~~ wrong.
The correct whole only has 16 pieces.
She's counting the entire picture, which is more than 1 whole.

28/28

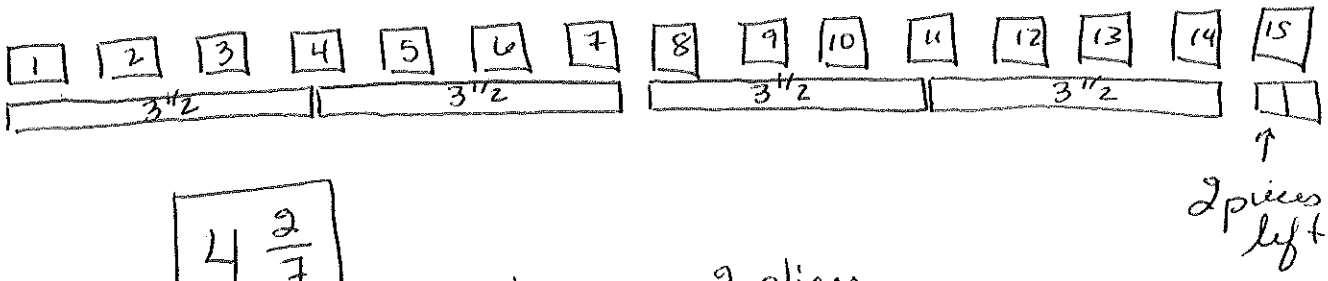
9. Consider the computation $15 \div 3\frac{1}{2}$.

(a) *[6 pts]* Explain how estimation could help a child to know whether this quotient is larger or smaller than 5. Do **not** actually compute the quotient. (1 or 2 sentences)

You're dividing by a number larger than 3, so it will "go in" fewer than 5 times.

(2) mention estimate.

(b) *[10 pts]* Now draw a diagram representing this computation. Circle your final answer, and explain *only* how the "left-over" is interpreted. (1 sentence)



$4\frac{2}{7}$

There are 2 slices left over. It takes 7 slices to make another group.

(-6) 4 + 2 halves left.
(-2) misdrawn

10. *[12 pts - 4 each]* Correctly spell the name of the property best indicated by each number sentence below.

(-1) sp.

(a) $\left(\frac{1}{3}+\frac{3}{4}\right)+\left(0+\frac{1}{2}\right)=\left(\frac{1}{3}+\frac{3}{4}\right)+\frac{1}{2}$ Identity Property of Addition (1)

(-1) Zero Prop of add.

(b) $\left(\frac{1}{3}+\frac{3}{4}\right)+\left(0+\frac{1}{2}\right)=\left(\frac{3}{4}+\frac{1}{3}\right)+\left(0+\frac{1}{2}\right)$ Commutative Property of Addition (1)

(c) $\left(\frac{1}{3}+\frac{3}{4}\right)+\left(0+\frac{1}{2}\right)=\left(\frac{1}{3}+\frac{3}{4}\right)+\left(0\cdot\frac{2}{5}+\frac{1}{2}\right)$ Zero Property of Multiplication (1)

(-2) Zero Def. of Mult.