

Math4010 Midterm 3 Jeopardy Review

Fractions

For each of these problems (10-50 points) , draw a picture to illustrate the reasoning for your answer.

10 points-- Which is bigger $\frac{13}{25}$ or $\frac{5}{8}$?

$$\frac{5}{8}$$

20 points-- $\frac{1}{3} \cdot \frac{2}{5} = \frac{2}{15}$

30 points-- $\frac{5}{6} - \frac{1}{5} = \frac{25-6}{30} = \frac{19}{30}$

40 points-- $\frac{5}{8} \div \frac{1}{3} = \frac{5}{8} \cdot \frac{3}{1} = \frac{15}{8}$

50 points-- $\frac{7}{10} + \frac{3}{7} = \frac{49+30}{70} = \frac{79}{70}$

60 points-- Simplify this expression (no calculator).

$$\frac{\frac{34}{\frac{1}{7} + \frac{2}{3}} - 4 \div \frac{22}{3}}{\frac{34}{\frac{17}{21}}} - (4 \cdot \frac{3}{22}) = 34 \cdot \frac{21}{17} - \frac{6}{11} = 42 - \frac{6}{11} = 41 \frac{5}{11}$$

Decimals

10 points—Express in simplest fraction form

(a) $0.\overline{15} = \frac{15}{99} = \frac{5}{33}$

(b) $0.1515 = \frac{1515}{10000} = \frac{303}{2000}$

(c) $0.1\overline{5} = \frac{14}{90} = \frac{7}{45}$

20 points—Simplify (without a calculator)

$$1.9(6.87 - 2.37) \div (3 \cdot 0.5 \cdot 0.3) = \frac{1.9(4.5)}{3(0.15)} = \frac{1.9(450)}{3(15)} = \frac{1.9(30)}{3} = 1.9(10) = 19.$$

30 points-- Change these fractions to decimals.

(a) $\frac{36}{75} = \frac{12}{25} = \frac{48}{100} = 0.48$

(b) $\frac{4}{14} = \frac{2}{7} = 0.\overline{285714}$

40 points-- Convert to a fraction. $31.01\overline{45} = \frac{144}{9900} = \frac{36}{2475} = \frac{12}{825} = \frac{4}{275}$

True/False

For each problem, determine if the statement is true or false. If it's false, explain why.

10 points-- Every whole number is a fraction. True

20 points-- The fraction $\frac{17}{51}$ is in simplest form. False, $\frac{17}{51} = \frac{1}{3}$

30 points-- The set of fractions is closed under division. False (we can't divide by zero)

40 points—The ratios $m : n$ and $p : q$ are equal if and only if $mq = np$. True

50 points—The fraction $\frac{27}{225}$ has a repeating, nonterminating decimal representation. False $\frac{27}{225} = \frac{3}{25} = \frac{12}{100} = 0.12$

60 points—The decimal 0.067 is read “67 hundredths.” False, it's 67 thousandths.

Hodge/Podge

10 points—Create a word problem for each of these computations.

(a) $3 \div \frac{2}{5}$ I have three whole pies. If a single serving is $\frac{2}{5}$ of the pie, how many servings do I have for my guests?

(b) $\frac{1}{2} \cdot \frac{4}{3}$ A recipe calls for $\frac{4}{3}$ cups of flour. I only want to make half of the recipe, so how much flour do I need?

20 points-- Order these numbers and plot them on a number line.

$$A = \frac{1}{5}, B = 0.\bar{5}, C = \frac{1}{2}, D = 0.3333, E = \frac{8}{9}, F = 0.15, G = \frac{1}{3}$$

$$F < A < D < G < C < B < E$$

30 points-- Conrad says that $\frac{4}{11} > \frac{3}{8}$ because $4 > 3$ and $11 > 8$. Discuss whether or not Conrad's reasoning is correct.

Actually $\frac{4}{11} < \frac{3}{8}$ is true. If the *numerators are fixed*, then the fraction with the larger denominator is smaller (because cutting it into more pieces makes the smaller fraction). Also, if the denominators are fixed, then the larger numerator makes a larger fraction. However, if neither the denominators nor numerators are the same, then we truly need to change the fractions to a common denominator to make the decision which is larger.

40 points-- Mary draws a picture to calculate $3 \cdot \frac{4}{5}$. From her picture, she concludes that $3 \cdot \frac{4}{5} = \frac{12}{15}$, since there are 12 pieces shaded in out of 15 total pieces. Is Mary correct? If not, where is her reasoning faulty?

There are 12 cake pieces shaded out of 15, but that's because we had three cakes, each with 4 out of 5 pieces shaded in. So, the "piece" size is still one fifth of a cake. Thus, $3 \cdot \frac{4}{5} = \frac{12}{5}$, i.e. 12 out of 5 pieces or 2 whole cakes and 2 out of 5 pieces of the third cake.

Story Problems (on Fractions/Percents/Ratios/Proportions)

10 points—Mrs. Martin bought $20\frac{1}{4}$ yards of material to make four bridesmaid dresses and one flower-girl dress. The flower girl's dress needs only half as much material as a bridesmaid dress. How much material is needed for a bridesmaid dress?

4.5 yards

20 points—Karl needs to fertilize his 6 acres. If it takes $8\frac{2}{3}$ bags of fertilizer for each acre, how much fertilizer does Karl need to buy?

52 bags

30 points-- Upon his death, Mr. Freespender left half of his estate to his wife, $\frac{1}{8}$ to each of his two children, $\frac{1}{16}$ to each of his three grandchildren, and the remaining \$15,000 to his favorite university. What was the value of his entire estate? \$240,000

40 points-- A department store marked down all of its summer clothing by 25%. The following week, the remaining items were marked down again 15% off the sale price. When Jeri bought two tank tops on sale, she presented a coupon that gave her an additional 20% off. What percent of the original price did Jeri save? 49%

50 points-- An airline passenger fell asleep halfway to her destination. When she awoke, the distance remaining was half the distance traveled while she slept. How much of the entire trip was she asleep? $\frac{1}{3}$

60 points—A road crew ordered 2.5 tons of gravel, but they only received $\frac{3}{2}$ tons of gravel. What percent of their order did the road crew receive? 60%

70 points-- A photograph measuring 3 inches by 2.5 inches is to be enlarged so that the smaller side, when enlarged, will be 8 inches. How long will the enlarged longer side be? 9.6 inches

80 points-- Alan has thrown 24 passes and completed 37.5% of them. How many consecutive passes will Alan have to complete if he wants to have a completion average above 58%? 12

90 points-- A mathematics test had 80 questions, each worth the same value. Wendy was correct on 55 of the questions. What percent of questions did Wendy get correct? 68.75%

100 points—Cari walked 3.4 km in 45 minutes. At that rate, how long will it take her to walk 11.2 km? About 148 minutes

110 points—Suppose you drive an average of 4460 miles every half-year in your car. At the end of $2\frac{3}{4}$ years, how far will your car have gone? 24530 miles