

Math 210 Test #3 Spring 2008

B. Noble

INSTRUCTIONS: Answer all questions and show your work clearly. *The point values add up to 75 points.* There is an extra credit question at the end.

1. (6 pts) If the ratio of boys-to-girls at a school picnic is 5:6,
(a) what is the ratio of girls-to-children?

$$\frac{6}{5+6} = \frac{6}{11} \text{ or } 6:11$$

- (b) If there are 143 children total, how many are girls? Show your work.

We set up a proportion. Let g be the number of girls at the school picnic. Then we have:

$$\frac{6}{11} = \frac{g}{143}$$

Since $11 \times 13 = 143$, that means we also multiply 6 by 13: $6 \times 13 = 78$. So there are 78 girls. NOTE: You can also solve for g by cross-multiplying.

2. (5 pts) In a photograph of a father and daughter, the father's height is $2\frac{1}{2}$ inches and the daughter's height is $1\frac{1}{2}$ inches. If the father is actually 70 inches tall, how tall is the daughter (in inches)? (*Hint: either set up a proportion or use scaling.*) Show work.

We set up a proportion, and let d be the height of the daughter: $\frac{2\frac{1}{2}}{70} = \frac{1\frac{1}{2}}{d}$. Cross-multiplying, we obtain: $2\frac{1}{2}d = 1\frac{1}{2} \cdot 70$, and after simplifying, we arrive that $d = 42$ inches. So the daughter is 42 inches tall (i.e., $3\frac{1}{2}$ feet).

3. (2 pts) A box contains 8 chocolate cookies and 6 sugar cookies. After 12 chocolate cookies and 10 sugar cookies are added to the box, what is the NEW RATIO of chocolate-to-sugar cookies? Simplify your answer.

There are now $8 + 12 = 20$ chocolate cookies, and $6 + 10 = 16$ sugar cookies. So the ratio of chocolate-to-sugar cookies is 20:16, but since we can reduce each by 4, we obtain the simplified ratio to be 5:4.

4. (11 pts) (a) Consider the number 82305.47196

(i) What digit is in the *thousands* place?

2

(ii) What is the *place value* of the digit 6?

hundred-thousandths

(b) Write out the number in decimal form whose expanded form is $4 \cdot 10^3 + 6 \cdot 10 + 7 \cdot 10^0 + 3 \cdot 10^{-2} + 8 \cdot 10^{-3}$
 $4000+60+7+0.03+0.008=4067.038$

(c) Express $\frac{7}{12}$ as a decimal. (show your long division and if repeating, write your answer with a bar over the repetend).

$0.58\overline{3}$

(d) Express $\overline{.39}$ as a fraction in simplest form. Show work.

Let $x = 0.\overline{39}$. Then $100x = 39.\overline{39}$, and subtracting x from both sides, we get $99x = 39$. Thus, dividing both sides by 99, $x = \frac{39}{99}$. Reducing by 3, $x = \frac{13}{33}$

5. (10 pts)

(a) Express 210% as a decimal.

Move the decimal two times to the Left: 2.1

(b) Express $\overline{.5}$ as a percent.

Move the decimal two times to the Right: $55.\overline{5}\%$

(c) Express $\frac{5}{4}\%$ as a fraction in simplest terms.

By definition of percent, $\frac{5}{4}\% = \frac{\frac{5}{4}}{100} = \frac{5}{4} \div 100 = \frac{5}{4} \cdot \frac{1}{100} = \frac{1}{80}$

(d) Express .00748 in scientific notation.

7.48×10^{-3}

(d) Fill in the blank with the correct number (you DON'T have to work out any division here):

$153.162 \div 2.54 = 15416.2 \div 254$ (move the decimal to the RIGHT twice for both numbers)

6. (9 pts) (a) Round 624.795 to the nearest

(i) hundred

600

(ii) one

625

(iii) hundredth

624.80

(b) ORDER the following five numbers from SMALLEST to LARGEST: $\frac{8}{9}$, $\overline{.84}$, $\frac{21}{25}$, $.84\overline{8}$, $.8\overline{4}$

$$\frac{8}{9} = 0.8888\dots$$

$$\overline{.84} = 0.8484\dots$$

$$\frac{21}{25} = 0.84$$

$$.84\overline{8} = 0.8488\dots$$

$$.8\overline{4} = 0.8444\dots$$

$$\frac{21}{25} < .8\overline{4} < \overline{.84} < .84\overline{8} < \frac{8}{9}$$

7. (4 pts) On a multiple choice test, Nick missed 28 out of 80 questions. What percent did he answer correctly?

He answered $80 - 28 = 52$ correctly. So the ratio that Nick answered correctly is $\frac{52}{80}$. To change this into a percent, all we need is a fraction whose denominator is 100—or you can do long division. I did it this way:

$\frac{52}{80} = \frac{26}{40} = \frac{13}{20}$. Then multiply the numerator and denominator by 5 to get 100 in the denominator: $\frac{13 \times 5}{20 \times 5} = \frac{65}{100} = 65\%$.

8. (5 pts) A watch is on sale for 15% off the original price. If the sale price is \$680, find the original price of the watch. Show work.

One way to solve this problem is to draw a percent-ruler for this problem. If the watch is 15% off, that means it costs 85% of the original price. I.e.,

85% \rightarrow \$680, dividing by 5...

17% \rightarrow \$136, multiplying by $\frac{100}{17}$...

$17 \cdot \frac{100}{17}\%$ \rightarrow $\$136 \cdot \frac{100}{17}$, note that $136 \div 17 = 8$

100% \rightarrow \$800

OR, you can use algebra. If you let P be the original price of the watch, then you solve $.85P = 680$. Either way, you will get the original cost of the watch is \$800.

9. (5 pts) Kate bought an antique desk and sold it a few years later for 30% more than she paid for it. If she sold it for \$1950, how much did she originally pay for the desk. Show work.

Again, you can use a percent-ruler or use algebra.

130% \rightarrow \$1950, dividing by 10...

13% \rightarrow \$195, dividing by 13...

1% \rightarrow \$15, multiplying by 100 (to get 100%)...

100% \rightarrow \$1500

OR you can solve $1.30P = 1950$, where P is the original price of the antique desk.

10. (4 pts) A computer originally costs \$1400. One year later, it had decreased in price to \$1274. By what percent had the price decreased? (that is, find the percent of decrease) Show work.

First, we need to find the DECREASE: $1400 - 1274 = 126$. Then the ratio of decrease is $\frac{126}{1400}$, since we are basing the decrease on the original cost of the computer. Now all we have to do is change this fraction into a percent. Dividing both the numerator and denominator by 14, we obtain: $\frac{126 \div 14}{1400 \div 14} = \frac{9}{100} = 9\%$

11. (3 pts) CIRCLE THE LETTER of the correct answer.

Circuit City advertises a DVD player as being marked down 40%

Best Buy's ad says it marked down the same DVD player 20% and will further mark it down an additional 20% off the sale price.

Where should you buy the DVD player? *Hint: if you like, think of the original price as \$100.*

A — CIRCUIT CITY

B — BEST BUY

C — It doesn't matter—you'll pay the same

Answer is **A**

If you suppose the price of the DVD player is \$100, then you pay \$60 at CIRCUIT CITY.

But at BEST BUY, you pay \$64, because if you take 20% off of \$100 first, the price of the DVD is \$80, and then take another 20% off of \$80.

12. (3 pts) A baby girl weighs 6 pounds at birth. By the time she is two years old, her weight has increased by 350%. What is the girl's weight at age 2? Show work.

100% \rightarrow 6 lbs. Dividing by 2,

50% \rightarrow 3 lbs. Multiplying by 7,

350% \rightarrow 21 lbs. So the girl's weight is 21 lbs at age 2.

13. (8 pts)

(a) Give on RATIONAL number (in decimal form) between .43 and $.4\bar{3}$

Lots of answers. One is 0.431

(b) Give one IRRATIONAL number (in decimal form) between .43 and $.4\bar{3}$

Lots of answers. One is 0.4312122122212222...

(c) Classify as RATIONAL or IRRATIONAL (no justification required)

(i) $6.\overline{27}$ RATIONAL

(ii) 6.27227222722227... IRRATIONAL

(iii) $\sqrt{2}$ IRRATIONAL

(iv) 3.1415926 RATIONAL (be careful—it terminates!)

BONUS QUESTIONS: 1. Find the smallest positive whole number k so that the fraction $\frac{k}{4500}$ is a terminating decimal.

In order to have a terminating decimal, we need ONLY powers of 2 and 5 in the denominator. The prime factorization of $4500 = 2^2 \cdot 3^2 \cdot 5^3$. So Take $k = 3^2 = 9$.

2. Find the difference between $0.1\bar{3}$ and .13 and express the answer as a fraction in simplest form.

Taken from Practice Test # 3