

Math 318
Study Sheet for Test 2

1. Suppose that it takes Sally 3 hours to mow a lawn, and it takes Tom 4 hours to mow the same lawn. Determine how long it would take Sally and Tom to mow the lawn if they worked together. (Be sure to show “sensible” steps—that a 4th or 5th grader could understand—not just a “method” that perhaps you don’t understand.)
2. Think about problem #1. **Before** a student solves it, how can she be sure that the answer must be less than 3 hours? Explain. How can she be sure that the answer must be more than 1.5 hours? Explain. How can she be sure that the answer must be less than 2 hours? Explain.
3. Insert the correct symbol (<, >, or =). Be prepared to explain your reasoning.

a) $\frac{4}{5} \times \frac{7}{8}$ 1

b) $\frac{4}{5} \div \frac{37}{98}$ 1

4. Indicate whether each statement is true or false:
 - a) The product of 10 proper fractions is less than 1.
 - b) In a division problem, if the divisor is less than the dividend, the quotient will be greater than 1.
 - c) In a multiplication problem, if the multiplier is greater than one, the product will be less than the multiplicand.
 - d) In a division problem, the quotient cannot be less than the dividend.
 - e) In a multiplication, the product is always larger than both the multiplier and the multiplicand.

5. Write a fraction word problem that matches $3\frac{3}{4} \div 1\frac{1}{8}$.

6. if hexagon = 2, then rhombus is equal to _____.

7. if trapezoid = $\frac{1}{3}$, then rhombus is equal to _____.

8. if rhombus = $\frac{1}{2}$, then trapezoid is equal to _____.

9. if hexagon = $\frac{3}{2}$, then triangle is equal to _____.

10. Show how a student could find the answer to this problem by finding a common denominator.

Clearly show and explain each step. $\frac{4}{5} \times \frac{7}{8}$

11. If $12 \div a = b$, then what is $12 \div 2a$?

12. If $x \div y = 6$, then what is $x \div 3y$?

13. If $c \div d = 4$, then what is $c \div 2d$?

14. If $4 \div m = n$, then what is $4 \div 2m$?

15.

16. What does $3\frac{1}{2} \div \frac{2}{5} = 8\frac{3}{4}$ mean?

17. Solve these problems in “nontraditional” ways—in other words, try to solve it the way a student might who has a basic understanding of fractions, but does not know all the “algorithms”. Be sure to clearly show your work and your reasoning.

- a) If Joslyn wants to make ribbons that are each $3\frac{3}{4}$ inches long, how many ribbons can she make from 4 yards of ribbon? How much ribbon (if any) will she have left over?
- b) How many Public Service Announcements can be made in 35 minutes of air time if each PSA takes $1\frac{1}{2}$ minutes?
- c) Travis was given a bag of sour worms and estimated that someone else (Monica?) had already eaten $\frac{1}{3}$ of the bag of worms. If Shannon then ate $\frac{3}{4}$ of what she was given, how much of the bag of worms remained?
- d) Suppose it takes a crew of 8 women 3 hours to paint a room. Three of them then quit, and the remaining 5 women have to apply the 2nd coat. What is the total time required for the 2 coats? (Assume that all the women work at the same rate.)
- e) A natural foods store sells eggs in the following ways: one dozen for \$2.50, 6 eggs for \$1.30, or 25 cents per egg. What is the best deal? Explain.
- f) If Dr. Smith can buy 5 Mr. Goodbar candy bars for \$2, how many of these can she get for \$17?
- g) Yvonne likes Nestle Crunch bars, but makes sure that he eats exactly $\frac{5}{8}$ of one bar every time. If he does this 15 times, how many whole Nestle Crunch bars could he make with the leftover pieces?

- h) Suppose $\frac{5}{8}$ of the students in a math class prefer chocolate candies over non-chocolate treats. How many of them voted against chocolate if there are 24 students in the class?
- i) If Sarah needs pieces of string that are each $5\frac{3}{4}$ inches long, how many such pieces can she make from a 2 yard long piece of string? How much string, if any, will she have left over?
- j) Mrs. Smith makes one regular sized blueberry pie for her family and then makes three small ones for kids in the neighborhood. If the regular sized pie requires 2 cups of berries, and the smaller pies are each $\frac{2}{3}$ as big as the regular sized pie, how many total cups of berries does Mrs. Smith need?

18. Suppose Debi (the free throw champion) makes 17 out of 20 free throws. She then announces that at that rate, she will make 97 out of 100 free throws. Is she right? If not, what is wrong with her reasoning?

19. Assume that a , b , and c are greater than zero, and that $a < b < c$. Insert the correct symbol ($<$, $>$, or $=$) and briefly but clearly explain your reasoning.

a) $\frac{a}{b+5} \div \frac{c+1}{b}$ 1

b) $\frac{b+5}{a} \times \frac{c+13}{a}$ 1

c) $\frac{c+2}{a} - \frac{b}{c+2}$ 0

d) $\frac{a}{2b+1} + \frac{c}{a} + \frac{4c}{b}$ 3

e) $\frac{b}{c+4} + \frac{a}{c+5}$ 2

f) $3 - \frac{b}{a} - \frac{c}{b}$ 1

g) $\frac{a}{3c}$ $\frac{c}{c-a}$

h) $\frac{c}{b-a}$ 1

i) $\frac{a}{b} - \frac{a}{c}$ 0

j) $\frac{2b}{a} + \frac{c}{b}$ 3

k) $\frac{a}{c} - \frac{c}{a}$ 0

l) $4 - \frac{2c}{b}$ 2

m) $\frac{a}{b+2} \times \frac{b}{c}$ $\frac{a}{b+2}$

n) $\frac{b+5}{a} \div \frac{b+5}{c}$ 1

o) $\frac{b}{c} - \frac{b+1}{a}$ 0

p) $\frac{c+2}{a} + \frac{3c}{b}$ 3

20. Suppose that it takes Sally 3 hours to mow a lawn, and it takes Tom 2 hours to mow the same lawn.

- Without solving the problem, explain how you know it would take less than 2 hours for Sally and Tom to mow the lawn if they work together.
- Without solving the problem, explain how you know that it would take more than 1 hour for Sally and Tom to mow the lawn if they work together.

21. Suppose that it takes Sally 3 hours to mow a lawn, and it takes Todd 5 hours to mow the same lawn. If they mow the lawn together, how long will it take them? Be sure to clearly show your work and your reasoning.

22. Insert the correct symbol (<, >, or =).

a) $\frac{3}{5} \times \frac{17}{8}$ 1

b) $\frac{4}{5} \div \frac{137}{98}$ 1

23. Briefly, but clearly, explain your reasoning for your answers to problem 12.

24. Write a fraction word problem that matches $5\frac{1}{2} \div 1\frac{1}{8}$.

25. What is $3\frac{1}{2} \div \frac{2}{5}$ asking?

26. At a veggie burger eating contest, Carl ate 6 burgers in 20 minutes. At this rate, how many burgers could he eat in 24 minutes? Solve this in a “sensible” way, not by using a memorized algorithm or method. Clearly show your work and your reasoning.