Week-In-Review 10 on 5.3

1. Given \( \frac{a+b}{cd} \). Identify the additive inverse and justify your answer.

2. Jeopardy: Melissa made 3 and \( \frac{1}{2} \) gallons of ginger ale, which she intends to bottle in “fifths” (that is, bottles that contain a fifth of a gallon). The answer is 17 full bottles and \( \frac{1}{2} \) of another bottle. What is the question?

3. Rewrite \( \frac{5}{24} \) and \( \frac{11}{98} \) with the same least common denominator.

4. If \( x, y, \) and \( z \) are integers and \( \frac{x}{y} = \frac{x}{z} \), what four things must be true?

5. Insert four fractions between \( \frac{3}{4} \) and \( \frac{-256}{81} \) so that the six numbers together constitute a geometric sequence.

6. Estimate to the nearest whole number \( 3 \frac{2}{3} - 6 \frac{4}{9} - 6 \frac{1}{2} + 2 \frac{3}{13} \).

7. Circle the properties that hold for division of rational numbers.

   closure    commutative    associative    identity

8. Find the number which is one-third of the way from \( \frac{3}{8} \) to \( 1 \frac{1}{4} \) on the number line.

9. Model \( \frac{1}{4} \cdot \frac{2}{3} \) using the rectangular model.

10. Solve \( \frac{1}{5^x} = 625 \).

11. Find the product \( 3 \frac{1}{5} \cdot 5 \frac{1}{3} \) and write your answer as a mixed number.

12. Fully simplify \( \left( -5x^3y^{-1}z^4 \right)^{-3} \) using only positive exponents in the final answer.

13. A student claims that if \( x \) is positive, then \( \frac{1}{x} < x \). What is your response?
14. A high school consists of \( \frac{2}{5} \) freshman, \( \frac{1}{4} \) sophomores and \( \frac{1}{10} \) juniors. What fraction of the class is seniors?

15. Fully simplify \( \frac{\frac{2}{5} - \frac{1}{2}}{\frac{9}{11} + \frac{9}{11}} \).

16. Find \( \left( 2 - \frac{3}{7} \right) \left( 8 \frac{3}{4} \right) \) as an improper fraction in lowest terms.

17. Using the rectangular model, illustrate and compute \( \frac{4}{5} \div \frac{1}{2} \).

18. A spool of ribbon contained 25 and \( \frac{1}{3} \) yards of brocade ribbon. The ribbon was divided evenly among 4 stores. One store sold all its ribbon. Another store sold \( \frac{1}{2} \) of its ribbon. Another store sold \( \frac{1}{4} \) of its ribbon. The last store was closed for inventory and sold none of its ribbon. How much of the original ribbon is left?

19. True or False:
   a. The additive inverse of the nonzero rational number \( \frac{a}{b} \) is \( \frac{b}{a} \).
   b. \( 2^{100} = 8 \cdot 2^{97} \)

20. Sarah is reading a book. She has finished \( \frac{5}{6} \) of the book and has 80 pages left to read. How many pages has she read? [Hint: Define your variable, set up an equation, and then solve your equation.]

21. Find the multiplicative inverse.
   a. \(-2\)
   b. \(-3\frac{4}{9}\)

22. Prove \( \frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc} \), where \( \frac{c}{d} \neq 0 \). Show each step.
23. Write each of the following in simplest form using positive exponents in the final answer. Assume all expressions are defined.

a. \((-\frac{4}{7})^{-3}\)

b. \((-x^{-4}y^2z)^{-5}\)

c. \(c^3k^0(c^2k^4)^\)

d. \(\left(\frac{x^7}{y^{11}}\right)^{-9}\)

e. \(\frac{x^{-1}}{x}\)

f. \(\left(\frac{-2a}{b^{-2}}\right)^3(ab^4)^6\)

g. \(\frac{-9(yz^{-4})^2}{13y^5z^{-6}}\)

h. \((3nmr)^2(mr^{-1})^{-4}\)

i. \(\frac{25^{32} \cdot 5^0 - 5^3 \cdot 5^{63}}{5^{-1} \cdot 5^{64} + 5^2 \cdot 125^{21}}\)


25. Use the distributive property of multiplication over addition to find the product:

\(\frac{7}{8} \cdot \frac{5}{9} = \)

26. Write a story that requires the division \(2\frac{3}{4} \div \frac{2}{3}\).

27. Explain and justify step-by-step using properties of rational numbers to explain \(5 \div (3 \div 4) = (5 \div 3) \cdot 4\).

28. Jacy has money in a savings account. Isabel has half as much in savings as Jacy. Kent has one-third as much in savings as Isabel. If Kent has $30 in savings, how much does Jacy have in savings?

29. Use a mental math technique to find the following product in simplest form.

\(8 \times 4\frac{1}{4}\)

30. Use techniques learned in Math 365 to write the following as a single fraction.

\(\frac{2}{3} - \frac{1}{3} \times \frac{1}{2} + \frac{4}{5} \div \frac{4}{3}\)