1. Write each ratio as a fraction in simplest form.
   a) 42 : 98
   b) 16 inches to 56 inches

2. A class consists of 17 men and 8 women. State the ratio of:
   a) Men to women
   b) Women to men
   c) Men to the total number of people in the class
   d) Women to the total number of people in the class

3. Translate the statement into a proportion: 8 is to 12 as 18 is to 27.

4. Find the value of \( n \):
   \[
   \frac{12 \text{ miles}}{3 \text{ hours}} = \frac{28 \text{ miles}}{n \text{ hours}}
   \]

5. Find the Least Common Multiple (LCM) of:
   a) 5, 10, and 50
   b) 36 and 90
   c) \( 18x^3 \) and \( 16x^7 \)
   d) \( 8xy, 12, \) and \( 42x^3 \)

6. Find the reciprocal.
   a) \( \frac{4}{9} \)
   b) \( \frac{10}{-7} \)
   c) \( \frac{4}{9} \)
   d) \( \frac{x}{y} \)

7. Simplify. Leave your answer in exponent form.
   a) \( \left( 5x^5yz^6 \right)^3 \)
   b) \( \frac{3^8n^0p^9r^6}{3^2k^5p^9r^{18}} \)
   c) \( \left( \frac{4}{9} \right)^7 \)
   d) \( \left( \frac{y}{2} \right)^5 \)

8. Simplify.
   \[
   \frac{-28x}{44x^2}
   \]

9. On a map of Texas, 1 inch on the map represents 180 miles. How many miles do 4 inches represent?
10. Add or subtract, as indicated. Simplify your answer completely.
   a) \( \frac{-4}{27} + \frac{-5}{27} \)
   b) \( \frac{2}{18} - \frac{17}{18} \)
   c) \( \frac{x}{6} + \frac{5}{6} \)
   d) \( \frac{7}{12} - \frac{5}{18} \)
   e) \( \frac{3}{4y} + \frac{13}{20y} \)
   f) \( \frac{3x}{14} - \frac{5x}{42} \)

11. Multiply or divide, as indicated. Simplify your answer completely.
   a) \( \frac{9}{24} \cdot \frac{8}{12} \)
   b) \( 2 \cdot \left( \frac{-21}{28} \right) \)
   c) \( \frac{15}{50} \div 10 \)
   d) \( \frac{-8}{24} \div \frac{6}{16} \)
   e) \( \frac{4y^6}{30} \div \frac{24y^2}{18} \)
   f) \( \frac{-8x^3}{25} \cdot \frac{-45}{18x} \)

12. Perform the indicated operation. Simplify your answer completely, and express your answer as an integer, proper fraction, or mixed number.
   a) \( \frac{318}{9} + \frac{157}{12} \)
   b) \( 20 \frac{2}{7} - 8 \frac{6}{7} \)
   c) \( 9 \frac{5}{12} - 2 \frac{7}{16} \)
   d) \( -2 \frac{5}{8} \cdot 3 \frac{1}{7} \)
   e) \( -5 \frac{7}{9} \div (-12) \)
   f) \( 6 \frac{3}{8} \div 2 \frac{1}{4} \)

13. Evaluate \( 14 - x \) for \( x = 9 \frac{5}{8} \)

   a) \( \frac{5}{6}x = 30 \)
   b) \( \frac{n}{-4} = -12 \)
   c) \( -24 = \frac{c}{3} \)
   d) \( \frac{y}{3^2} = 4 + 6 \div 2 \)
15. Perform the indicated operations. Simplify your answer completely.

a) \[ \frac{5}{6} \cdot \frac{3}{4} + \frac{1}{4} \div \frac{2}{3} \]

b) \[ \left( \frac{4}{5} \right)^2 - \frac{6}{7} \cdot \frac{7}{20} \]

c) \[ \frac{\sqrt{y}}{9} \]

d) \[ \frac{4}{9} + \frac{6}{27} - \frac{1}{12} \]

e) Find \( \frac{3}{5} \) of \( \frac{15}{18} \).

f) \( \frac{(-3)^2 + 12}{7} \)

g) \( \frac{5}{0} \)

h) \( \frac{0}{-8} \)

i) \( 0 \div 9 \)

j) \( (-7) \div 0 \)

16. What is the unit rate if a car travels 324 miles on 14 gallons of gas? (State your answer as a mixed number in simplified form and include appropriate units.)

17. If it takes Tessa 14 minutes to water 8 rows of plants in her garden, how long should it take her to water 28 rows of plants?

18. A box of 6 ink cartridges is $228 and a box of 8 is $312.
   a) Find the unit price of each.
   b) Which is the better buy?

19. Pierre wants to store \( 8 \frac{1}{4} \) pounds of flour in 6 equal-size containers. How much flour should Pierre place in each container? Simplify your answer completely.

20. Manny walked \( \frac{5}{6} \) mile to a friend’s house and then \( \frac{3}{4} \) mile to the park. How far did Manny walk? Simplify your answer completely.

21. Ramona has 40 feet of ribbon. If she needs \( \frac{2}{5} \) of the ribbon for a decorating project, how much will she use? How much will she still have for other projects?

22. Tia purchased 80 feet of fencing for a rectangular dog run. How much fencing will she have left after she encloses the \( 25 \frac{1}{4} \) by \( 8 \frac{5}{6} \) foot dog run?

23. A recipe requires \( 2 \frac{1}{4} \) cups of flour and serves 12 people. How many cups of flour would be needed for the recipe to serve 18 people?
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1. a) \( \frac{3}{7} \)
   b) \( \frac{2}{7} \)

2. a) \( \frac{17}{8} \)
   b) \( \frac{8}{17} \)
   c) \( \frac{17}{25} \)
   d) \( \frac{8}{25} \)

3. \( \frac{8}{12} = \frac{18}{27} \)

4. \( n = 7 \)

5. a) 50
   b) 180
   c) \( 144x^7 \)
   d) \( 168x^3y \)

6. a) \( \frac{1}{6} \)
   b) \( \frac{7}{10} \)
   c) \( \frac{9}{4} \)
   d) \( \frac{y}{x} \)

7. a) \( 5^3 x^{15} y^3 z^{18} \)
   b) \( \frac{3^6}{k^5 r^{12}} \)
   c) \( \frac{4^7}{9^7} \)
   d) \( \frac{y^5}{25} \)

8. \( \frac{7}{11x} \)

9. 720 miles
10. 
   a) \(-\frac{1}{3}\)  
   b) \(-\frac{5}{6}\)  
   c) \(\frac{x + 5}{6}\)  
   d) \(\frac{11}{36}\)  
   e) \(\frac{7}{5y}\)  
   f) \(\frac{2x}{21}\)

11. 
   a) \(\frac{1}{4}\)  
   b) \(-\frac{3}{2}\) or \(-1\frac{1}{2}\)  
   c) \(\frac{3}{100}\)  
   d) \(-\frac{8}{9}\)  
   e) \(\frac{y^4}{10}\)  
   f) \(\frac{4x^2}{5}\)

12. 
   a) \(47\frac{17}{36}\)  
   b) \(11\frac{3}{7}\)  
   c) \(6\frac{47}{48}\)  
   d) \(-8\frac{1}{4}\)  
   e) \(\frac{13}{27}\)  
   f) \(2\frac{5}{6}\)

13. \(4\frac{3}{8}\)

14. 
   a) \(x = 36\)  
   b) \(n = 48\)  
   c) \(c = -72\)  
   d) \(y = 63\)
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15.

a) \( \frac{1}{1} \)  

b) \( \frac{17}{50} \)  

c) \( \frac{5}{3y^3} \)  

d) \( \frac{8}{3} \) or \( 2 \frac{2}{3} \)  

e) \( \frac{1}{2} \)  

f) 9  

g) undefined  

h) 0  

i) 0  

j) undefined  

16. \( 23 \frac{1}{7} \) miles per gallon  

17. 49 minutes  

18. a) $38 per cartridge in the box of 6, and $39 per cartridge in the box of 8  
b) The box of 6 is the better buy because each cartridge costs less.  

19. \( \frac{11}{8} \) or \( 1 \frac{3}{8} \) pounds of flour in each container  

20. \( \frac{19}{12} \) or \( 1 \frac{7}{12} \) miles  

21. Ramona will use 16 feet of ribbon for the decorating project and will still have 24 feet of ribbon for other projects.  

22. Tia will have \( \frac{71}{6} \) or \( 11 \frac{5}{6} \) feet of fencing remaining.  

23. The recipe requires \( \frac{27}{8} \) or \( 3 \frac{3}{8} \) cups of flour to serve 18 people.