MATHTEACH: Fractions and Proportional Reasoning

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Name: _____ Date: _____ Score: / 30

Learning Objectives

- Add, subtract, multiply, and divide fractions and mixed numbers
- Connect fractions, decimals, and percents
- Set up and solve proportions
- Interpret ratios and unit rates in real-world contexts

Simplify each expression completely. Show all steps and circle your final answer.

Adding fractions

1. Add the fractions and simplify: 1/2 + 3/3.

$$\frac{1}{2} + \frac{3}{3}$$

Answer: _____

2. A recipe calls for 1/4 cup of flour and 3/3 cup of sugar. How much total dry ingredient is needed?

$$\frac{1}{4} + \frac{3}{3}$$

Answer: _____

3. Add: 4/7 + 5/8. Simplify your answer completely.

$$\frac{4}{7} + \frac{5}{8}$$

Answer: _____

4. Add the fractions and simplify: 5/2 + 4/7.

$$\frac{5}{2} + \frac{4}{7}$$

Answer: _____

5. A recipe calls for 1/4 cup of flour and 3/6 cup of sugar. How much total dry ingredient is needed?

$$\frac{1}{4} + \frac{3}{6}$$

Answer: _____

6. Add: 5/4 + 2/8. Simplify your answer completely.

$$\frac{5}{4}+\frac{2}{8}$$

Answer: _____

7. Add the fractions and simplify: 1/4 + 4/5.

$$\frac{1}{4}+\frac{4}{5}$$

Answer: _____

8. A recipe calls for 2/6 cup of flour and 3/2 cup of sugar. How much total dry ingredient is needed?

$$\frac{2}{6}+\frac{3}{2}$$

Answer: _____

Multiplying fractions

9. Multiply the fractions and simplify: 3/5 x 4/4.

$$\frac{3}{5}\times\frac{4}{4}$$

Answer: _____

10. Multiply: 1/5 x 1/7. Simplify your answer.

$$\frac{1}{5}\times\frac{1}{7}$$

Answer: _____

11. A recipe calls for 2/2 cup of sugar. If you are making 2/4 of the recipe, how many cups of sugar do you need?

$$\frac{2}{2}\times\frac{2}{4}$$

Answer: _____

12. Multiply the fractions and simplify: 2/2 x 6/5.

$$\frac{2}{2}\times\frac{6}{5}$$

Answer: _____

13. Multiply: 3/4 x 5/4. Simplify your answer.

$$\frac{3}{4} \times \frac{5}{4}$$

Answer: _____

14. A recipe calls for 2/2 cup of sugar. If you are making 3/2 of the recipe, how many cups of sugar do you need?

$$\frac{2}{2} \times \frac{3}{2}$$

Answer: _____

Percent of a number

15. Find 75% of 120.

75% of 120

Answer: _____

16. A shirt costs $120. It is 10% off. How many dollars is the discount?

10% of 120

Answer: _____

17. A store is offering a 41% discount on an item priced at $88. How many dollars is the discount?

41% of 88

Answer: _____

18. Find 75% of 60.

75% of 60

Answer: _____

19. A shirt costs $200. It is 50% off. How many dollars is the discount?

50% of 200

Answer: _____

20. A store is offering a 40% discount on an item priced at $51. How many dollars is the discount?

40% of 51

Answer: _____

Solving proportions

21. Solve the proportion: 2/4 = 2/x. Find x.

$$\frac{2}{4} = \frac{2}{x}$$

Answer: _____

22. A car travels 11 miles on 2 gallons of gas. How many miles can it travel on 6 gallons? Set up a proportion 2/11 = 6/x and solve.

$$\frac{2}{11} = \frac{6}{x}$$

Answer: _____

23. If 6 shirts cost $37, how much do 7 shirts cost? Set up and solve a proportion.

$$\frac{6}{37} = \frac{7}{x}$$

Answer: _____

24. Solve the proportion: 4/6 = 3/x. Find x.

$$\frac{4}{6} = \frac{3}{x}$$

Answer: _____

25. A car travels 19 miles on 1 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 1/19 = 5/x and solve.

$$\frac{1}{19} = \frac{5}{x}$$

Answer: _____

26. If 2 shirts cost $13, how much do 10 shirts cost? Set up and solve a proportion.

$$\frac{2}{13} = \frac{10}{x}$$

Answer: _____

Writing and simplifying ratios

27. Write the ratio 12 to 36 in simplest form.

$$12 : 36$$

Answer: _____

28. A bag contains 2 red marbles and 6 blue marbles. Write the ratio of red to blue in simplest form.

$2 : 6$

Answer: _____

29. Write the ratio 24 to 9 in simplest form.

$24 : 9$

Answer: _____

30. A bag contains 12 red marbles and 4 blue marbles. Write the ratio of red to blue in simplest form.

$12 : 4$

Answer: _____

MATHTEACH: Fractions and Proportional Reasoning

ANSWER KEY & SOLUTIONS

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Topics: Solving proportions, Writing and simplifying ratios, Percent of a number, Adding fractions, Multiplying fractions. All answers verified by independent computation.

Solutions

Adding fractions

1. Add the fractions and simplify: 1/2 + 3/3.

$$\frac{1}{2} + \frac{3}{3}$$

→ *Find a common denominator, then add numerators. Simplify if possible.*
→ *Result: 3/2.*

Answer: = 3/2

2. A recipe calls for 1/4 cup of flour and 3/3 cup of sugar. How much total dry ingredient is needed?

$$\frac{1}{4} + \frac{3}{3}$$

→ *Total = 1/4 + 3/3 = 5/4 cups.*

Answer: = 5/4

3. Add: 4/7 + 5/8. Simplify your answer completely.

$$\frac{4}{7} + \frac{5}{8}$$

→ *Find the LCD of 7 and 8: LCD = 56.*
→ *Rewrite each fraction with denominator 56.*
→ *Add numerators and simplify: 67/56.*

Answer: = 67/56

4. Add the fractions and simplify: 5/2 + 4/7.

$$\frac{5}{2} + \frac{4}{7}$$

→ *Find a common denominator, then add numerators. Simplify if possible.*
→ *Result: 43/14.*

Answer: = 43/14

5. A recipe calls for 1/4 cup of flour and 3/6 cup of sugar. How much total dry ingredient is needed?

$$\frac{1}{4} + \frac{3}{6}$$

→ *Total = 1/4 + 3/6 = 3/4 cups.*

Answer: = 3/4

6. Add: 5/4 + 2/8. Simplify your answer completely.

$$\frac{5}{4} + \frac{2}{8}$$

→ *Find the LCD of 4 and 8: LCD = 8.*
→ *Rewrite each fraction with denominator 8.*
→ *Add numerators and simplify: 3/2.*

Answer: = 3/2

7. Add the fractions and simplify: 1/4 + 4/5.

$$\frac{1}{4} + \frac{4}{5}$$

→ *Find a common denominator, then add numerators. Simplify if possible.*
→ *Result: 21/20.*

Answer: $= 21/20$

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8. A recipe calls for 2/6 cup of flour and 3/2 cup of sugar. How much total dry ingredient is needed?

$$\frac{2}{6} + \frac{3}{2}$$

→ *Total = 2/6 + 3/2 = 11/6 cups.*

Answer: $= 11/6$

Multiplying fractions

9. Multiply the fractions and simplify: 3/5 x 4/4.

$$\frac{3}{5} \times \frac{4}{4}$$

→ *Multiply numerators: 3 x 4 = 12.*
→ *Multiply denominators: 5 x 4 = 20.*
→ *Simplify 12/20: 3/5.*

Answer: $\frac{12}{20} = 3/5$

10. Multiply: 1/5 x 1/7. Simplify your answer.

$$\frac{1}{5} \times \frac{1}{7}$$

→ *Multiply numerators: 1 x 1 = 1.*
→ *Multiply denominators: 5 x 7 = 35.*
→ *Simplify 1/35: 1/35.*

Answer: $\frac{1}{35} = 1/35$

11. A recipe calls for 2/2 cup of sugar. If you are making 2/4 of the recipe, how many cups of sugar do you need?

$$\frac{2}{2} \times \frac{2}{4}$$

→ *Multiply the fractions: 2/2 x 2/4.*
→ *Numerator: 2 x 2 = 4. Denominator: 2 x 4 = 8.*
→ *Simplify: 1/2 cups.*

Answer: $\frac{4}{8} = 1/2$

12. Multiply the fractions and simplify: 2/2 x 6/5.

$$\frac{2}{2} \times \frac{6}{5}$$

→ *Multiply numerators: 2 x 6 = 12.*
→ *Multiply denominators: 2 x 5 = 10.*
→ *Simplify 12/10: 6/5.*

Answer: $\frac{12}{10} = 6/5$

13. Multiply: 3/4 x 5/4. Simplify your answer.

$$\frac{3}{4} \times \frac{5}{4}$$

→ *Multiply numerators: 3 x 5 = 15.*
→ *Multiply denominators: 4 x 4 = 16.*
→ *Simplify 15/16: 15/16.*

Answer: $\frac{15}{16} = 15/16$

14. A recipe calls for 2/2 cup of sugar. If you are making 3/2 of the recipe, how many cups of sugar do you need?

$$\frac{2}{2} \times \frac{3}{2}$$

→ *Multiply the fractions: 2/2 x 3/2.*
→ *Numerator: 2 x 3 = 6. Denominator: 2 x 2 = 4.*
→ *Simplify: 3/2 cups.*

Answer: $\frac{6}{4} = 3/2$

Percent of a number

15. Find 75% of 120.

75% of 120

→ *Convert: 75% = 75/100.*
→ *Multiply: 75/100 x 120 = 90.*

Answer: $75\% \times 120 \div 100 = 90$

16. A shirt costs $120. It is 10% off. How many dollars is the discount?

10% of 120

→ *Discount = 10% of $120 = 10/100 x 120 = $12.*

Answer: $10\% \times 120 \div 100 = 12$

17. A store is offering a 41% discount on an item priced at $88. How many dollars is the discount?

41% of 88

→ *Discount = 41% x $88.*
→ *Convert percent: 41/100 = decimal.*
→ *Discount = 41 x 88 / 100 = $36.*

Answer: $41\% \times 88 \div 100 = 36$

18. Find 75% of 60.

75% of 60

→ *Convert: 75% = 75/100.*
→ *Multiply: 75/100 x 60 = 45.*

Answer: $75\% \times 60 \div 100 = 45$

19. A shirt costs $200. It is 50% off. How many dollars is the discount?

50% of 200

→ *Discount = 50% of $200 = 50/100 x 200 = $100.*

Answer: $50\% \times 200 \div 100 = 100$

20. A store is offering a 40% discount on an item priced at $51. How many dollars is the discount?

40% of 51

→ *Discount = 40% x $51.*
→ *Convert percent: 40/100 = decimal.*
→ *Discount = 40 x 51 / 100 = $20.*

Answer: $40\% \times 51 \div 100 = 20$

Solving proportions

21. Solve the proportion: 2/4 = 2/x. Find x.

$$\frac{2}{4} = \frac{2}{x}$$

→ *Cross-multiply: 2 x = 4 x 2 = 8.*
→ *Divide: x = 8 / 2 = 4.*

Answer: $x = 8 \div 2 = 4$

22. A car travels 11 miles on 2 gallons of gas. How many miles can it travel on 6 gallons? Set up a proportion 2/11 = 6/x and solve.

$$\frac{2}{11} = \frac{6}{x}$$

→ *x = (11 x 6) / 2 = 66 / 2 = 33 miles.*

Answer: $x = 66 \div 2 = 33$

23. If 6 shirts cost $37, how much do 7 shirts cost? Set up and solve a proportion.

$$\frac{6}{37} = \frac{7}{x}$$

→ *Set up the proportion: 6/37 = 7/x.*
→ *Cross-multiply: 6x = 259.*
→ *Divide both sides by 6: x = 259/6 = 259/6.*

Answer: $x = 259 \div 6 = 259/6$

24. Solve the proportion: 4/6 = 3/x. Find x.

$$\frac{4}{6} = \frac{3}{x}$$

→ *Cross-multiply: 4 x = 6 x 3 = 18.*
→ *Divide: x = 18 / 4 = 9/2.*

Answer: $x = 18 \div 4 = 9/2$

25. A car travels 19 miles on 1 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 1/19 = 5/x and solve.

$$\frac{1}{19} = \frac{5}{x}$$

→ *x = (19 x 5) / 1 = 95 / 1 = 95 miles.*

Answer: $x = 95 \div 1 = 95$

26. If 2 shirts cost $13, how much do 10 shirts cost? Set up and solve a proportion.

$$\frac{2}{13} = \frac{10}{x}$$

→ *Set up the proportion: 2/13 = 10/x.*
→ *Cross-multiply: 2x = 130.*
→ *Divide both sides by 2: x = 130/2 = 65.*

Answer: $x = 130 \div 2 = 65$

Writing and simplifying ratios

27. Write the ratio 12 to 36 in simplest form.

$12 : 36$

→ *Write as a ratio: 12:36.*
→ *Find the GCF of 12 and 36: GCF = 4.*
→ *Divide both parts by 4: 3:9.*

Answer: $\div 4 \Rightarrow 3 : 9$

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28. A bag contains 2 red marbles and 6 blue marbles. Write the ratio of red to blue in simplest form.

$2 : 6$

→ *Ratio of red to blue: 2:6.*
→ *GCF of 2 and 6 = 2.*
→ *Simplest form: 1:3.*

Answer: $\div 2 \Rightarrow 1 : 3$

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29. Write the ratio 24 to 9 in simplest form.

$24 : 9$

→ *Write as a ratio: 24:9.*
→ *Find the GCF of 24 and 9: GCF = 3.*
→ *Divide both parts by 3: 8:3.*

Answer: $\div 3 \Rightarrow 8 : 3$

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30. A bag contains 12 red marbles and 4 blue marbles. Write the ratio of red to blue in simplest form.

$12 : 4$

→ *Ratio of red to blue: 12:4.*
→ *GCF of 12 and 4 = 2.*
→ *Simplest form: 6:2.*

Answer: $\div 2 \Rightarrow 6 : 2$
