PREALG: Ratios Proportions and Percents

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Name: _____ Date: _____ Score: / 30

Learning Objectives

- Write and simplify ratios
- Solve proportions using cross-multiplication
- Compute percent of a number
- Solve percent increase/decrease and real-world percent problems

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

Percent of a number

1. Find 10% of 20.

10% of 20

Answer: _____

2. A shirt costs $100. It is 10% off. How many dollars is the discount?

10% of 100

Answer: _____

3. A store is offering a 36% discount on an item priced at $153. How many dollars is the discount?

36% of 153

Answer: _____

4. A fundraiser has raised 37% of its $263 goal. How many dollars have been raised?

37% of 263

Answer: _____

5. Find 25% of 20.

25% of 20

Answer: _____

6. A shirt costs $200. It is 20% off. How many dollars is the discount?

20% of 200

Answer: _____

7. A store is offering a 18% discount on an item priced at $132. How many dollars is the discount?

18% of 132

Answer: _____

8. A fundraiser has raised 25% of its $150 goal. How many dollars have been raised?

25% of 150

Answer: _____

9. Find 75% of 60.

75% of 60

Answer: _____

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

50% of 200

Answer: _____

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

40% of 51

Answer: _____

12. A fundraiser has raised 46% of its $197 goal. How many dollars have been raised?

46% of 197

Answer: _____

Solving proportions

13. Solve the proportion: 1/8 = 1/x. Find x.

$$\frac{1}{8} = \frac{1}{x}$$

Answer: _____

14. A car travels 12 miles on 2 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 2/12 = 5/x and solve.

$$\frac{2}{12} = \frac{5}{x}$$

Answer: _____

15. If 6 shirts cost $20, how much do 6 shirts cost? Set up and solve a proportion.

$$\frac{6}{20} = \frac{6}{x}$$

Answer: _____

16. Solve the proportion: 1/9 = 6/x. Find x.

$$\frac{1}{9} = \frac{6}{x}$$

Answer: _____

17. A car travels 21 miles on 1 gallons of gas. How many miles can it travel on 6 gallons? Set up a proportion 1/21 = 6/x and solve.

$$\frac{1}{21} = \frac{6}{x}$$

Answer: _____

18. If 6 shirts cost $16, how much do 7 shirts cost? Set up and solve a proportion.

$$\frac{6}{16} = \frac{7}{x}$$

Answer: _____

19. Solve the proportion: 1/6 = 4/x. Find x.

$$\frac{1}{6} = \frac{4}{x}$$

Answer: _____

20. A car travels 13 miles on 1 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 1/13 = 5/x and solve.

$$\frac{1}{13} = \frac{5}{x}$$

Answer: _____

21. If 5 shirts cost $40, how much do 12 shirts cost? Set up and solve a proportion.

$$\frac{5}{40} = \frac{12}{x}$$

Answer: _____

Writing and simplifying ratios

22. Write the ratio 10 to 35 in simplest form.

$10 : 35$

Answer: _____

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

$12 : 12$

Answer: _____

24. On a team, 12 players are seniors and 28 players are juniors. Write the ratio of seniors to juniors in simplest form.

$12 : 28$

Answer: _____

25. Write the ratio 20 to 15 in simplest form.

$20 : 15$

Answer: _____

26. A bag contains 12 red marbles and 16 blue marbles. Write the ratio of red to blue in simplest form.

$12 : 16$

Answer: _____

27. On a team, 20 players are seniors and 16 players are juniors. Write the ratio of seniors to juniors in simplest form.

$20 : 16$

Answer: _____

28. Write the ratio 3 to 9 in simplest form.

$3 : 9$

Answer: _____

29. A bag contains 4 red marbles and 16 blue marbles. Write the ratio of red to blue in simplest form.

$4 : 16$

Answer: _____

30. On a team, 16 players are seniors and 28 players are juniors. Write the ratio of seniors to juniors in simplest form.

$16 : 28$

Answer: _____

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ANSWER KEY & SOLUTIONS

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

Solutions

Percent of a number

1. Find 10% of 20.

10% of 20

→ *Convert: 10% = 10/100.*
→ *Multiply: 10/100 x 20 = 2.*

Answer: $10\% \times 20 \div 100 = 2$

2. A shirt costs $100. It is 10% off. How many dollars is the discount?

10% of 100

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

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

3. A store is offering a 36% discount on an item priced at $153. How many dollars is the discount?

36% of 153

→ *Discount = 36% x $153.*
→ *Convert percent: 36/100 = decimal.*
→ *Discount = 36 x 153 / 100 = $55.*

Answer: $36\% \times 153 \div 100 = 55$

4. A fundraiser has raised 37% of its $263 goal. How many dollars have been raised?

37% of 263

→ *Amount raised = 37% x $263.*
→ *= 37 x 263 / 100 = $97.*

Answer: $37\% \times 263 \div 100 = 97$

5. Find 25% of 20.

25% of 20

→ *Convert: 25% = 25/100.*
→ *Multiply: 25/100 x 20 = 5.*

Answer: $25\% \times 20 \div 100 = 5$

6. A shirt costs $200. It is 20% off. How many dollars is the discount?

20% of 200

→ *Discount = 20% of $200 = 20/100 x 200 = $40.*

Answer: $20\% \times 200 \div 100 = 40$

7. A store is offering a 18% discount on an item priced at $132. How many dollars is the discount?

18% of 132

→ *Discount = 18% x $132.*
→ *Convert percent: 18/100 = decimal.*
→ *Discount = 18 x 132 / 100 = $23.*

Answer: $18\% \times 132 \div 100 = 23$

8. A fundraiser has raised 25% of its $150 goal. How many dollars have been raised?

25% of 150

→ *Amount raised = 25% x $150.*
→ *= 25 x 150 / 100 = $37.*

Answer: $25\% \times 150 \div 100 = 37$

9. Find 75% of 60.

75% of 60

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

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

10. 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: $50\% \times 200 \div 100 = 100$

11. 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: $40\% \times 51 \div 100 = 20$

12. A fundraiser has raised 46% of its $197 goal. How many dollars have been raised?

46% of 197

→ *Amount raised = 46% x $197.*
→ *= 46 x 197 / 100 = $90.*

Answer: $46\% \times 197 \div 100 = 90$

Solving proportions

13. Solve the proportion: 1/8 = 1/x. Find x.

$$\frac{1}{8} = \frac{1}{x}$$

→ *Cross-multiply: 1 x = 8 x 1 = 8.*
→ *Divide: x = 8 / 1 = 8.*

Answer: $x = 8 \div 1 = 8$

14. A car travels 12 miles on 2 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 2/12 = 5/x and solve.

$$\frac{2}{12} = \frac{5}{x}$$

→ *x = (12 x 5) / 2 = 60 / 2 = 30 miles.*

Answer: $x = 60 \div 2 = 30$

15. If 6 shirts cost $20, how much do 6 shirts cost? Set up and solve a proportion.

$$\frac{6}{20} = \frac{6}{x}$$

→ *Set up the proportion: 6/20 = 6/x.*
→ *Cross-multiply: 6x = 120.*
→ *Divide both sides by 6: x = 120/6 = 20.*

Answer: $x = 120 \div 6 = 20$

16. Solve the proportion: 1/9 = 6/x. Find x.

$$\frac{1}{9} = \frac{6}{x}$$

→ *Cross-multiply: 1 x = 9 x 6 = 54.*
→ *Divide: x = 54 / 1 = 54.*

Answer: $x = 54 \div 1 = 54$

17. A car travels 21 miles on 1 gallons of gas. How many miles can it travel on 6 gallons? Set up a proportion 1/21 = 6/x and solve.

$$\frac{1}{21} = \frac{6}{x}$$

→ *x = (21 x 6) / 1 = 126 / 1 = 126 miles.*

Answer: $x = 126 \div 1 = 126$

18. If 6 shirts cost $16, how much do 7 shirts cost? Set up and solve a proportion.

$$\frac{6}{16} = \frac{7}{x}$$

→ *Set up the proportion: 6/16 = 7/x.*
→ *Cross-multiply: 6x = 112.*
→ *Divide both sides by 6: x = 112/6 = 56/3.*

Answer: $x = 112 \div 6 = 56/3$

19. Solve the proportion: 1/6 = 4/x. Find x.

$$\frac{1}{6} = \frac{4}{x}$$

→ *Cross-multiply: 1 x = 6 x 4 = 24.*
→ *Divide: x = 24 / 1 = 24.*

Answer: $x = 24 \div 1 = 24$

20. A car travels 13 miles on 1 gallons of gas. How many miles can it travel on 5 gallons? Set up a proportion 1/13 = 5/x and solve.

$$\frac{1}{13} = \frac{5}{x}$$

→ *x = (13 x 5) / 1 = 65 / 1 = 65 miles.*

Answer: $x = 65 \div 1 = 65$

21. If 5 shirts cost $40, how much do 12 shirts cost? Set up and solve a proportion.

$$\frac{5}{40} = \frac{12}{x}$$

→ *Set up the proportion: 5/40 = 12/x.*
→ *Cross-multiply: 5x = 480.*
→ *Divide both sides by 5: x = 480/5 = 96.*

Answer: $x = 480 \div 5 = 96$

Writing and simplifying ratios

22. Write the ratio 10 to 35 in simplest form.

$10 : 35$

→ *Write as a ratio: 10:35.*
→ *Find the GCF of 10 and 35: GCF = 5.*
→ *Divide both parts by 5: 2:7.*

Answer: $\div 5 \Rightarrow 2 : 7$

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

$12 : 12$

→ *Ratio of red to blue: 12:12.*
→ *GCF of 12 and 12 = 3.*
→ *Simplest form: 4:4.*

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

24. On a team, 12 players are seniors and 28 players are juniors. Write the ratio of seniors to juniors in simplest form.

$12 : 28$

→ *Write the ratio of seniors to juniors: 12:28.*
→ *Find the GCF of 12 and 28: GCF = 4.*
→ *Divide both parts by 4: 3:7.*

Answer: $\div 4 \Rightarrow 3 : 7$

25. Write the ratio 20 to 15 in simplest form.

$20 : 15$

→ *Write as a ratio: 20:15.*
→ *Find the GCF of 20 and 15: GCF = 5.*
→ *Divide both parts by 5: 4:3.*

Answer: $\div 5 \Rightarrow 4 : 3$

26. A bag contains 12 red marbles and 16 blue marbles. Write the ratio of red to blue in simplest form.

$12 : 16$

→ *Ratio of red to blue: 12:16.*
→ *GCF of 12 and 16 = 4.*
→ *Simplest form: 3:4.*

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

27. On a team, 20 players are seniors and 16 players are juniors. Write the ratio of seniors to juniors in simplest form.

$20 : 16$

→ *Write the ratio of seniors to juniors: 20:16.*
→ *Find the GCF of 20 and 16: GCF = 4.*
→ *Divide both parts by 4: 5:4.*

Answer: $\div 4 \Rightarrow 5 : 4$

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28. Write the ratio 3 to 9 in simplest form.

$3 : 9$

→ *Write as a ratio: 3:9.*
→ *Find the GCF of 3 and 9: GCF = 3.*
→ *Divide both parts by 3: 1:3.*

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

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29. A bag contains 4 red marbles and 16 blue marbles. Write the ratio of red to blue in simplest form.

$4 : 16$

→ *Ratio of red to blue: 4:16.*
→ *GCF of 4 and 16 = 4.*
→ *Simplest form: 1:4.*

Answer: $\div 4 \Rightarrow 1 : 4$

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30. On a team, 16 players are seniors and 28 players are juniors. Write the ratio of seniors to juniors in simplest form.

$16 : 28$

→ *Write the ratio of seniors to juniors: 16:28.*
→ *Find the GCF of 16 and 28: GCF = 4.*
→ *Divide both parts by 4: 4:7.*

Answer: $\div 4 \Rightarrow 4 : 7$
