PRACTICE SET 2: RATIOS, PROPORTIONS, AND PERCENTS

1. The ratio of boys to girls in a class is 3:4. If there are 12 boys, how many girls are there?

A. 9

B. 14

C. 16

D. 20

2. A car travels 150 miles on 5 gallons of gas. What is its fuel efficiency?

A. 30 mpg

B. 25 mpg

C. 28 mpg

D. 32 mpg

3. What is 20% of 150?

A. 15

B. 25

C. 20

D. 30

4. A store sells 3 pencils for $1.20. What is the price of 10 pencils?

A. $3.00

B. $4.00

C. $4.50

D. $5.00

5. A shirt originally priced at $80 is marked down 25%. What is the sale price?

A. $60

B. $65

C. $70

D. $75

6. If 5 apples cost $2.50, what is the cost of 12 apples?

A. $5.00

B. $5.50

C. $6.00

D. $6.50

7. A recipe calls for 3 cups of flour for every 2 cups of sugar. How much flour is needed for 8 cups of sugar?

A. 10 cups

B. 11 cups

C. 13 cups

D. 12 cups

8. What percent of 40 is 12?

A. 25%

B. 30%

C. 35%

D. 40%

9. A number increased by 50% equals 60. What is the original number?

A. 30

B. 35

C. 38

D. 40

10. A class has 25 students, and 80% passed the test. How many passed?

A. 20

B. 18

C. 22

D. 24

11. The sale price of a coat is $72 after a 20% discount. The original price was:

A. $80

B. $84

C. $88

D. $90

12. In a class of 30 students, the ratio of girls to boys is 2:3. How many girls are there?

A. 10

B. 12

C. 15

D. 18

13. A savings account earns 4% simple interest annually. How much interest does $500 earn in 2 years?

A. $40

B. $45

C. $50

D. $55

14. A map scale shows 1 inch = 40 miles. Two cities are 3.5 inches apart. How far apart are they?

A. 120 miles

B. 130 miles

C. 140 miles

D. 150 miles

15. A sweater was $60 and is now $48. What is the percent decrease?

A. 15%

B. 18%

C. 22%

D. 20%

16. If 8 workers complete a job in 12 days, how many days would 6 workers take?

A. 16

B. 14

C. 18

D. 20

17. A school has 400 students; 120 play sports. What percent play sports?

A. 25%

B. 28%

C. 30%

D. 35%

18. The ratio of red to blue marbles is 5:3. If there are 15 red marbles, how many blue are there?

A. 6

B. 9

C. 12

D. 18

19. A restaurant bill is $48. With a 15% tip, the total is:

A. $52.00

B. $53.50

C. $54.50

D. $55.20

20. What is 125% of 80?

A. 100

B. 95

C. 110

D. 120

21. A pair of shoes costs $75 with 8% tax. The total is:

A. $80

B. $81

C. $82

D. $83

22. 18 is what percent of 60?

A. 25%

B. 27%

C. 28%

D. 30%

23. The ratio of teachers to students is 1:15. If there are 300 students, how many teachers?

A. 20

B. 22

C. 25

D. 30

24. A bike is reduced from $200 to $170. What is the percent decrease?

A. 10%

B. 12%

C. 15%

D. 18%

25. If 3 gallons of paint cover 360 square feet, how many gallons are needed for 600 square feet?

A. 4

B. 5

C. 6

D. 7

26. A salary of $45,000 increased by 6%. The new salary is:

A. $47,000

B. $47,500

C. $47,400

D. $47,700

27. A survey of 250 people shows 150 prefer tea. What percent prefer tea?

A. 60%

B. 55%

C. 65%

D. 70%

28. A store's profit margin is 20% on a $50 cost. The selling price is:

A. $55

B. $58

C. $60

D. $65

29. If 2/3 of a number is 18, the number is:

A. 24

B. 25

C. 26

D. 27

30. A family budgets 30% of their $4,000 income for rent. Rent is:

A. $1,000

B. $1,200

C. $1,300

D. $1,400

31. A worker's wage rose from $20 to $23. The percent increase is:

A. 15%

B. 12%

C. 18%

D. 20%

32. A recipe serves 6 and uses 4 cups of broth. For 9 servings, how much broth is needed?

A. 5 cups

B. 5.5 cups

C. 6 cups

D. 7 cups

33. What is 35% of 200?

A. 50

B. 60

C. 65

D. 70

34. A tank is 75% full with 90 gallons. Its capacity is:

A. 100 gallons

B. 120 gallons

C. 130 gallons

D. 140 gallons

35. A lawn is mowed in the ratio 3:2 by John and Mary. If Mary mows 40 square meters, how much does John mow?

A. 60

B. 50

C. 45

D. 80

36. A phone costs $480 after a 20% discount. The original price was:

A. $540

B. $560

C. $580

D. $600

37. 40% of a number is 24. The number is:

A. 50

B. 55

C. 60

D. 65

38. A store increases prices by 10%. A $25 item now costs:

A. $26.50

B. $27.50

C. $28.00

D. $29.00

39. What is 5% of 160?

A. 8

B. 9

C. 10

D. 11

40. A ratio of 4:5 is equivalent to:

A. 6:7

B. 9:10

C. 10:12

D. 8:10

41. A student scores 18 out of 24 on a test. What percent is that?

A. 65%

B. 70%

C. 72%

D. 75%

42. An investment of $1,000 earns 6% per year simple interest. After 3 years, the total interest is:

A. $150

B. $180

C. $200

D. $220

43. A bag of candy is shared in the ratio 2:3:5 by three kids. If the total is 50 pieces, the middle share is:

A. 15

B. 12

C. 10

D. 20

44. What is 250 increased by 10%?

A. 260

B. 270

C. 275

D. 280

45. A photo is enlarged by 50%. If its original length is 8 inches, the new length is:

A. 10 inches

B. 11 inches

C. 13 inches

D. 12 inches

46. A $250 appliance is on sale for 12% off. The savings is:

A. $25

B. $30

C. $32

D. $35

47. The ratio 6:8 in lowest terms is:

A. 3:4

B. 4:5

C. 2:3

D. 5:6

48. A population grew from 5,000 to 6,000. The percent increase is:

A. 15%

B. 18%

C. 20%

D. 25%

49. What is 3/5 expressed as a percent?

A. 30%

B. 50%

C. 55%

D. 60%

50. A worker completes 2/3 of a project. What percent remains?

A. 25%

B. 33⅓%

C. 40%

D. 50%

PRACTICE SET 2: ANSWER KEY AND EXPLANATIONS

1. C — 16. The ratio 3:4 means for every 3 boys there are 4 girls. Setting up the proportion 3/4 = 12/x and cross-multiplying gives 3x = 48, so x = 16 girls.
2. A — 30 mpg. Dividing total miles by total gallons gives 150 ÷ 5 = 30 miles per gallon. Fuel efficiency is a unit rate calculated by dividing distance by fuel consumed.
3. D — 30. Calculating 20% of 150 means multiplying 0.20 × 150 = 30. Percent-of calculations always convert the percent to a decimal first.
4. B — $4.00. The unit price is $1.20 ÷ 3 = $0.40 per pencil, and 10 × $0.40 = $4.00. Unit rate problems find the per-item cost first, then multiply by the new quantity.
5. A — $60. A 25% discount means paying 75% of the original: 0.75 × $80 = $60. The shortcut method multiplies by the remaining percentage.
6. C — $6.00. The unit price is $2.50 ÷ 5 = $0.50 per apple, and 12 × $0.50 = $6.00. Unit rate calculations work reliably for any proportional scaling.
7. D — 12 cups. Setting up the proportion 3/2 = x/8 and cross-multiplying gives 2x = 24, so x = 12 cups. Recipe scaling preserves the original ratio between ingredients.
8. B — 30%. Dividing 12/40 gives 0.30, which converts to 30%. Percent problems always divide the part by the whole.
9. D — 40. If a 50% increase produces 60, then 60 represents 150% of the original. Dividing 60 by 1.5 gives 40 as the original number.
10. A — 20. Calculating 80% of 25 means multiplying 0.80 × 25 = 20 students passed.
11. D — $90. A 20% discount means paying 80% of the original, so $72 ÷ 0.80 = $90. Reverse percentage problems divide the new value by the percentage it represents.
12. B — 12. The ratio 2:3 has 5 parts total, and 30 ÷ 5 = 6 students per part. Girls represent 2 parts, so 2 × 6 = 12 girls.
13. A — $40. Simple interest uses I = Prt, giving I = 500 × 0.04 × 2 = $40. Simple interest applies only to the original principal.
14. C — 140 miles. Multiplying the map distance by the scale gives 3.5 × 40 = 140 miles. Scale drawings use direct multiplication to convert to actual distances.

15. D — 20%. The decrease is $60 − $48 = $12, and dividing by the original gives 12/60 = 0.20 = 20%. Percent change always uses the original as the denominator.

16. A — 16. This is an inverse variation: more workers means less time. If 8 × 12 = 96 worker-days, then 96 ÷ 6 = 16 days for 6 workers.

17. C — 30%. Dividing 120 by 400 gives 0.30, which converts to 30%. The calculation shows what portion of the total students play sports.

18. B — 9. The ratio 5:3 gives the proportion 5/3 = 15/x, so 5x = 45 and x = 9 blue marbles.

19. D — $55.20. A 15% tip is 0.15 × 48 = $7.20, and the total is $48 + $7.20 = $55.20. Alternatively, multiplying by 1.15 gives the same result in one step.

20. A — 100. Calculating 125% of 80 means multiplying 1.25 × 80 = 100. Percentages greater than 100% produce results larger than the original.

21. B — $81. The tax is 0.08 × 75 = $6, and adding to the original gives $75 + $6 = $81. The one-step method uses 1.08 × 75 = $81.

22. D — 30%. Dividing 18/60 gives 0.30, which converts to 30%. Percent problems always divide the part by the whole.

23. A — 20. The proportion 1/15 = x/300 cross-multiplies to 15x = 300, so x = 20 teachers. Ratio problems scale directly through cross-multiplication.

24. C — 15%. The decrease is $200 − $170 = $30, and dividing by the original gives 30/200 = 0.15 = 15%.

25. B — 5. Setting up 3/360 = x/600 and cross-multiplying gives 360x = 1,800, so x = 5 gallons.

26. D — $47,700. A 6% increase means multiplying by 1.06: $45,000 × 1.06 = $47,700. Salary increase calculations use the multiplier form.

27. A — 60%. Dividing 150/250 gives 0.60, which converts to 60%. Survey results are typically expressed as percentages of the total sample.

28. C — $60. A 20% markup on $50 adds $10 to the cost: $50 + $10 = $60. Alternatively, multiplying by 1.20 gives the same result.

29. D — 27. If 2/3 of a number is 18, then the number is 18 ÷ (2/3) = 18 × 3/2 = 27.

30. B — $1,200. Calculating 30% of $4,000 means multiplying 0.30 × 4,000 = $1,200. Budget allocation problems apply the percentage directly.

31. A — 15%. The increase is $23 − $20 = $3, and dividing by the original gives 3/20 = 0.15 = 15%.

32. C — 6 cups. Setting up 4/6 = x/9 and cross-multiplying gives 6x = 36, so x = 6 cups. Recipe scaling uses proportional reasoning.

33. D — 70. Calculating 35% of 200 means multiplying $0.35 \times 200 = 70$.

34. B — 120 gallons. If 75% represents 90 gallons, then $90 \div 0.75 = 120$ gallons total capacity.

35. A — 60. The ratio 3:2 means John mows 3 parts for every 2 Mary mows. If 2 parts equal 40 square meters, each part is 20, so John mows $3 \times 20 = 60$ square meters.

36. D — $600. An 80% sale price gives $480, so the original was $480 ÷ 0.80 = $600.

37. C — 60. If 40% of a number is 24, the number is $24 \div 0.40 = 60$.

38. B — $27.50. Multiplying by 1.10 gives $25 × 1.10 = $27.50. Price increase calculations use the multiplier form.

39. A — 8. Calculating 5% of 160 means multiplying $0.05 \times 160 = 8$.

40. D — 8:10. Multiplying both parts of 4:5 by 2 gives 8:10, which is an equivalent ratio.

41. D — 75%. Dividing 18/24 gives 0.75, which converts to 75%. Test score percentages divide correct answers by total questions.

42. B — $180. Simple interest gives $I = 1{,}000 \times 0.06 \times 3 = \$180$. Simple interest calculates only on the original principal.

43. A — 15. The ratio 2:3:5 has 10 parts total, and $50 \div 10 = 5$ pieces per part. The middle share (3 parts) gets $3 \times 5 = 15$ pieces.

44. C — 275. A 10% increase means multiplying $250 \times 1.10 = 275$.

45. D — 12 inches. A 50% enlargement means multiplying $8 \times 1.50 = 12$ inches.

46. B — $30. Calculating 12% of $250 means multiplying $0.12 \times 250 = \$30$ in savings.

47. A — 3:4. Dividing both parts of 6:8 by the GCF of 2 gives 3:4 in lowest terms.

48. C — 20%. The increase is $6{,}000 - 5{,}000 = 1{,}000$, and dividing by the original gives $1{,}000/5{,}000 = 0.20 = 20\%$.

49. D — 60%. Dividing 3 by 5 gives 0.60, which converts to 60%.

50. B — 33⅓%. If 2/3 is complete, then 1/3 remains, which equals 33⅓% as a percent.