CHAPTER 3 REVIEW

Formulas, Proportions, and Percent

SECTION 3.1 – FORMULAS

Evaluate each formula.

1. The formula for the volume V of a rectangular solid is $V = LWH$, where L is the length, W is the width, and H is the height. Find V if $L = 4$, $W = 2$, and $H = 1.5$.

2. The formula for the area of a triangle is $A = \frac{1}{2}bh$, where b is the base and h is the height. Find A if $b = 5$ and $h = 8$.

3. In physics, force F is measured by the formula $F = ma$ where m is the mass and a is the acceleration. Find F when $m = 35$ and $a = 10$.

4. The equation of a line passing through a point (x, y) with a y-intercept b is described by the equation $y = mx + b$. Find y when $m = -2$, $x = 5$, and $b = -4$.

5. In the formula $I = Prt$, find t if $I = 1200$, $P = 2000$, and $r = 0.1$.

6. In the formula $r = \frac{d}{t}$, find d if $r = 50$ and $t = 3$.

7. The formula used to determine the perimeter P of a rectangle is $P = 2L + 2W$ where L is the length and W is the width. Find L if $P = 24$ and $W = 5$.

8. Use the linear equation $2x - 3y = 12$ to find x when $y = -2$.

Solve each formula.

9. In the equation $I = Prt$, solve for t.

10. In the equation $t = \frac{d}{r}$, solve for d.

11. In the equation $t = \frac{d}{r}$, solve for r.

12. In the equation $4x + 2y = 20$, solve for y.

13. In the equation $9x - 3y = 12$, solve for y.

14. In the equation $A = \frac{B - C}{2}$, solve for B.

15. In the equation $r = 3(s + t)$, solve for t.

SECTION 3.2 – PROPORTIONS

Determine if the following proportions are true.

16. $\frac{22}{16} = \frac{32}{24}$

17. $\frac{11}{4.4} = \frac{8}{3.2}$

Solve the following proportions.

For problems involving decimals, give the answer in decimal form. For problems involving fractions, give the answer in fractional form.

18. $\frac{n}{12} = \frac{5}{30}$

19. $\frac{5}{2} = \frac{n}{7}$

20. $\frac{-35}{28} = \frac{5}{n}$

21. $\frac{3.5}{n} = \frac{0.5}{8}$

22. $\frac{n}{17} = \frac{-3.75}{51}$

23. $\frac{\frac{7}{6}}{14} = \frac{n}{\frac{12}{5}}$

Translate each problem into a proportion and solve the problem.

24. A recipe that makes 12 doughnuts requires 2 cups of flour. How many doughnuts can be made from 3 cups of flour?

25. The doughnut recipe calls for ¼ teaspoon of salt for every ½ cup of flour. How much salt should be used for 2 cups of flour?

26. On a map, 2 centimeters represents 4 kilometers. How many kilometers are represented by 15 centimeters?

27. Water is being pumped out of a pool at a rate of 120 gallons per hour. How many hours will it take to pump 7800 gallons of water out of the pool?

28. A nurse has to give a patient a dose of medication. The dosage says to administer 2.5 ml of medication for a 100 pound person. If the patient weighs 150 pounds, how many ml of medication should the nurse give to the patient?

29. A preschool must have a ratio of 2 teachers for every 5 children. If there are 8 teachers, how many children can be enrolled in the preschool?

30. Amanda gets 17 miles per gallon of gasoline in her truck. If she has 15 gallons of gasoline in her truck, how far can she go?

Perform each unit conversion using a proportion.

31. Convert 8 feet to inches. Use the conversion fact: **12 inches = 1 foot (ft)**

32. Convert 25 feet to yards. Use the conversion fact: **3 feet (ft) = 1 yard (yd)**

33. Convert 180 seconds to minutes. Use the conversion fact: **60 seconds (s) = 1 minute (min)**

34. Convert 1.5 gallons to quarts. Use the conversion fact: **4 quarts (qt) = 1 gallon (gal)**

35. Convert $2\frac{1}{2}$ pounds to ounces. Use the conversion fact: **16 ounces (oz) = 1 pound (lb)**

36. Convert 85 centimeters to meters. Use the conversion fact: **100 centimeters (cm) = 1 meter (m)**

37. Convert 3.7 meters to millimeters. Use the conversion fact: **1000 millimeters (mm) = 1 meter (m)**

38. Convert 2345 liters to kiloliters. Use the conversion fact: **1 kiloliters (kL) = 1000 liter (L)**

39. Convert 52.7 grams to centigrams. Use the conversion fact: **100 centigrams (cg) = 1 gram (g)**

40. Convert 8 kilograms to grams. Use the conversion fact: **1 kilogram (kg) = 1000 grams (g)**

SECTION 3.3 – PERCENT

Complete each conversion problem.

41. Write 27% as a fraction.

42. Write 32% as a fraction.

43. Write $\frac{17}{50}$ as a percent.

44. Write $\frac{3}{2}$ as a percent.

45. Write 0.54 as a percent.

46. Write 0.018 as a percent.

47. Write 30% as a decimal.

48. Write 4.5% as a decimal.

Solve each percent problem.

49. What is 72% of 200?

50. What is 150% of 90?

51. What percent of 250 is 45?

52. What percent of 80 is 2?

53. 92 is 50% of what number?

54. 80 is 2% of what number?

55. 19% of 320 is what number?

56. 16 is what percent of 80?

Solve each application problem.

57. Sean wants to buy a board game that costs $29.50. If the tax rate is 6%, how much will he pay in tax?

58. Vlad bought a pair of shoes for $65 and paid $5.20 in sales tax. What is the tax rate for the state where he bought the shoes?

59. The price of speakers is $70 but Roberto has a coupon for 25% off any item. How much will Roberto save if he uses the coupon to purchase the speakers?

60. Jodi sells real estate. If her commission rate is 3% and her commission check this month is $16,200, how much did she sell this month?

61. You earn $21,000 this year. Due to a promotion, you will get a 2.5% raise for next year. What is the dollar amount of your raise? What will your salary be next year?

62. A server received a $13 tip for a restaurant bill of $65. What percent of the total bill did the server receive?

63. A bank charges a 7% annual simple interest rate on loans. How much interest must you pay on a loan of $1000 for 5 years?

64. What annual simple interest rate is needed in order to double an initial investment of $500 in 4 years?

65. What amount is the principal in a savings account if $1800 is earned in interest after 6 years at a 2% annual simple interest rate?

Answers to Chapter 3 Review

SECTION 3.1
Formulas

1. $V = 12$
2. $A = 20$
3. $F = 350$
4. $y = -14$
5. $t = 6$
6. $d = 150$
7. $L = 7$
8. $x = 3$
9. $t = \frac{I}{Pr}$
10. $d = rt$
11. $r = \frac{d}{t}$
12. $y = 10 - 2x$ or $y = -2x + 10$
13. $y = -4 + 3x$ or $y = 3x - 4$
14. $B = 2A + C$
15. $t = \frac{r - 3s}{3}$ or $t = \frac{r}{3} - s$

SECTION 3.2
Proportions

16. False
17. True
18. $n = 2$
19. $n = \frac{35}{2}$ or $n = 17.5$
20. $n = -4$
21. $n = 56$
22. $n = -1.25$
23. $n = \frac{1}{5}$
24. 18 doughnuts
25. 1 teaspoon of salt
26. 30 kilometers
27. 65 hours
28. 3.75 ml
29. 20 children
30. 255 miles
31. 96 inches
32. $\frac{25}{3}$ yards **OR** $8\frac{1}{3}$ yards
33. 3 minutes
34. 6 quarts
35. 40 ounces
36. 0.85 meters
37. 3700 millimeters
38. 2.345 kiloliters
39. 5270 centigrams
40. 8000 grams

SECTION 3.3
Percent

41. $\frac{27}{100}$
42. $\frac{8}{25}$
43. 34 %
44. 150%
45. 54%
46. 1.8%
47. 0.3
48. 0.045
49. 144
50. 135
51. 18 %
52. 2.5%
53. 184
54. 4000
55. 60.8
56. 20%
57. $1.77
58. 8%
59. $17.50
60. $540,000
61. Raise: $525
    New Salary: $21,525
62. 20%
63. $350
64. 25%
65. $15,000