

Worcester State University Placement Test Arithmetic Study Guide

Disclaimer: *This study guide is intended to assist in preparation for the Arithmetic Placement Test at Worcester State University by providing practice problems on the various topics covered on the test, as well as skills needed in all courses beyond MA 098:Developmental Arithmetic. Please note that problems on the test will be different than those presented here. Answers to all problems appear at the end of this packet. If you require any assistance, free drop-in tutoring is available at the WSU Math Center (Sullivan 140) during the fall and spring semesters – stop by S-140 to see the current schedule. NOTE: Students may NOT use calculators during the test.*

Operations with Whole Numbers

These operations include addition, subtraction, multiplication, and division.

Addition

1. $70,114 + 222$
2. $232,156 + 199,987$

Subtraction

3. $8706 \text{ meters} - 1041 \text{ meters}$
4. $10,000 - 6,758$

Multiplication

5. $(5500)(900)$
6. $551 \cdot 94$

Division

7. $912 \div 6$
8. $30,835 \div 5$
9. $\frac{3559}{17}$

Operations with Fractions

Fraction skills are very important in all mathematics classes. These include basic operations and the ability to solve problems using fractions, decimals and percents. Understanding prime factors, reducing fractions, conversion between mixed and improper fractions, and finding equivalent fractions are all basic skills for fractions. If you lack any of these basic skills or need a review, we recommend you visit the WSU Math Center.

Addition

$$10. \frac{3}{4} + \frac{3}{20}$$

$$11. \frac{1}{3} + \frac{6}{12} + \frac{3}{6}$$

$$12. 7\frac{5}{6} + 2\frac{3}{8}$$

Subtraction

$$13. \frac{8}{15} - \frac{1}{20}$$

$$14. 19\frac{3}{5} - 3\frac{1}{2}$$

$$15. 13 - 6\frac{3}{5}$$

Multiplication

$$16. \frac{5}{8} \cdot \frac{1}{5}$$

$$17. \frac{3}{8} \times 24$$

$$18. 1\frac{3}{5} \times 6\frac{1}{4}$$

$$19. 1\frac{1}{7} \cdot \frac{3}{8}$$

Division

$$20. 2\frac{6}{7} \div 10$$

$$21. \frac{1}{2} \div \frac{3}{4}$$

$$22. \frac{2\frac{1}{2}}{4\frac{3}{4}}$$

$$23. 7\frac{7}{8} \div 4\frac{1}{4}$$

Operations with Decimals

Operations with decimals skills including basic operations of addition, subtraction, multiplication and division.

Addition

$$24. 0.649 + 26$$

$$25. 3.1105 + 3.6112$$

Subtraction

$$26. 44 - 0.165$$

$$27. \$33 - \$8.44$$

Multiplication

$$28. 76.4 \times 2.4$$

$$29. 0.02 \cdot 0.07$$

Division

$$30. \frac{34.8}{8.7}$$

$$31. \frac{0.825}{18.75}$$

Simplifying Arithmetic Expressions

*These problems require PEMDAS or order of operations. Remember multiplication and division are equal and you work from left to right. For example $12 / 2 * 3 = 18$ not 2.*

32. $54 - 2^3 \cdot (10 - 8)$

33. $19(25) - 8(7)$

34. $\frac{3(8 - 7) + 3 \cdot 5}{3(3 - 1)}$

35. $4 \cdot (3 + 5)^2 - 3(6 - 4)^2$

36. $54 + 4 \cdot 72 \div 2$

37. $\sqrt{49}$ and $\sqrt{400}$

Solving Simple Linear Equations and Proportions

For this test, you need to be able to solve simple linear equations like the ones shown.

38. $6b = \frac{1}{2}$

39. $x + 5 = 14.2$

40. $\frac{7}{\frac{1}{4}} = \frac{8}{x}$

41. $\frac{8}{\frac{1}{2}} = \frac{2.4}{x}$

Converting Percents, Fractions, and Decimals

These conversions can appear as a standalone problem or within another problem. Remember it is usually advisable to convert all to decimals or all to fractions before simplifying an expression or equation.

42. Express $\frac{1}{8}$ as a decimal and a percent to the nearest whole percent

43. Express 98 as a percent

44. Express $65\frac{1}{2}\%$ as a fraction and as decimal

Finding Perimeter and Area of Squares and Rectangles

Remember that for rectangles the perimeter is 2 times the sum of the length and the width ($2 \times (\text{length} + \text{width})$), while the area is the product of the length and the width ($\text{length} \times \text{width}$).

45. Find the area and perimeter of a square whose side is 2.7 centimeters.
46. Find the area and perimeter of a rectangle measuring $4\frac{2}{3}$ millimeters by $1\frac{1}{2}$ millimeters.

Solving Word Problems

For word problems, read them carefully twice, then drawing a picture or creating a table may help. First identify the operations and then build an equation or expression.

47. A florist filled three orders for wedding flowers and made the following amounts of money: \$251, \$677, and \$698. How much money on average did she make per order?
48. In one year, a baseball player got 195 hits in 532 times at bat. What was his batting average to the nearest thousandth?
49. The population of a city is 6 million. It is estimated that this is about $\frac{2}{5}$ of the projected population fifty years later. What is the projected population of the city?
50. A recipe for cookies calls for $7\frac{1}{2}$ cups of flour. If the recipe is for 4 dozen cookies, how much flour is needed for 16 dozen cookies?
51. Find 130% of 3840.
52. 8% of what number is 28?
53. What percent of 22 is 198?
54. A lab technician has 3600 milliliters of a solution. 2% is acid. How many milliliters are acid?
55. A customer paid \$4.53 in sales tax on a set of chairs that cost \$151. What is the sales tax rate?
56. Find the amount of discount when the original price is \$90 and the discount rate is 10%.
57. What is the sales tax on a radio priced at \$130 if the sales tax rate is 9.7%? What is the total cost?

58. A mine produces an ore that is approximately 10% iron. How much ore must be mined to produce 50 pounds of iron?
59. One share of stock which originally sold for \$150 now sells for \$30. What is the percent decrease?
60. The enrollment at a local college increased 2% over last year's enrollment of 2700. What is the current enrollment?

Answers

Answers for all problems

- 70,336
- 432,143
- 7665 meters
- 3,242
- 4,950,000
- 51,794
- 152
- 6,167
- 209 R6
- $\frac{9}{10}$
- $1\frac{1}{3}$
- $10\frac{5}{24}$
- $\frac{29}{60}$
- $16\frac{1}{10}$
- $6\frac{2}{5}$
- $\frac{1}{8}$
- 9
- 10
- $\frac{3}{7}$
- $\frac{2}{7}$
- $\frac{2}{3}$
- $\frac{10}{19}$
- $1\frac{29}{34}$
- 26.649
- 6.7217
- 43.835
- 24.56
- 183.36
- 0.0014
- 4
- 0.044
- 38
- 419
- 3
- 244
- 198
- 7 and 20
- $\frac{1}{12}$
- 9.2
- $\frac{2}{7}$
- 0.15
- 0.125, 13%
- 9800%
- $\frac{131}{200}$, 0.655

45. area is 7.29 cm^2 , perimeter is 10.8 cm 53. 900%
46. area is 7 mm^2 , perimeter is $12\frac{1}{3} \text{ mm}$ 54. 72 mg
47. 542 is the average cost 55. 3%
48. 0.367 is the batting average 56. the discount is $\$9$
49. 15 million 57. sales tax $\$12.61$, total cost $\$142.61$
50. 30 cups of flour 58. 500 pounds
51. 4992 59. 80% decrease
52. 350 60. 2754 students