

**Math Review Preparation for Placement Test
Wayne Community College
Numerical Part**

The mathematics department at Wayne Community College has developed this review booklet to help refresh basic math skills before taking the placement test. The purpose of the placement test is to determine the appropriate course(s) students need to take. Some mathematics courses have pre-requisites that you must fulfill.

We realize how easy it is to temporarily forget skills you do not use every day. The problems in this packet are intended to refresh your memory. The packet is designed to help you review, not to learn, math skills.

In this review, important concepts are summarized. Examples illustrating these concepts are also included. Practice with these examples as a guide. Do not be concerned if you are unable to work any or all of the problems. Additional problems are located at the end of this review for practice. Answers are provided.

The Compass mathematics placement test has five areas: pre-algebra, algebra, college algebra, geometry, and trigonometry. Because Compass is an adaptive test, the number of items administered will differ.

Preparation:

- Review this review information.
- Arrive at least 10 minutes prior to testing.
- Bring at least two #2 pencils to the test.

Taking the Test

- Read all directions carefully.
- Read each question carefully paying attention to phrases such as "all of the above" and "none of the above".
- Don't forget to complete all parts of the test.
- It is best to work out all answers since you are not being timed. Guessing on Compass is not recommended.
- You are allowed to use your own calculator.

Wayne Community College developed this review with input from Coastal Carolina Community College as well as Lenoir Community College. Good luck on your placement test!

Concept #1: Fractions

Reducing Fractions: To simplify a fraction, divide the numerator and denominator by all common factors.

Example: $\frac{12}{18} = \frac{12 \div 6}{18 \div 6} = \frac{2}{3}$

To multiply fractions:

- Multiply numerators
- Multiply denominators
- Reduce resulting fraction

Example: $\frac{5}{6} \times \frac{4}{15} = \frac{20}{90} = \frac{2}{9}$

To divide fractions:

- Copy down the first fraction
- Invert (flip) the second fraction
- Now multiply the fractions

Example: $\frac{5}{6} \div \frac{4}{15} = \frac{5}{6} \times \frac{15}{4} = \frac{75}{24} = \frac{25}{8}$

To add or subtract fractions:

- Find the Least Common Denominator (LCD): The smallest number that each of the denominators will divide into evenly.
- In each fraction, multiply the numerator and denominator by the same number to obtain the common denominator.
- Add or subtract the numerators and keep the common denominator.

Example: $\frac{1}{2} + \frac{2}{7} + \frac{3}{8} = \frac{1 \times 28}{2 \times 28} + \frac{2 \times 8}{7 \times 8} + \frac{3 \times 7}{8 \times 7} = \frac{28}{56} + \frac{16}{56} + \frac{21}{56} = \frac{65}{56}$

To change a mixed number to an improper fraction:

- Multiply the denominator by the whole number.
- Add that number to the numerator.
- Place the sum over the denominator.

Example: $5\frac{2}{3} = \frac{3 \times 5 + 2}{3} = \frac{17}{3}$

To change an improper fraction to a mixed number:

- Divide the denominator into the numerator.
- The whole number in the mixed number is the quotient, and the fraction is the remainder over the denominator.

Example: $\frac{17}{5} = 3\frac{2}{5}$

To multiply or divide whole numbers and/or mixed numbers:

- Change to improper fractions.
- Multiply or divide the fractions.
- Change answer back into a mixed number, if necessary.

Example: $4\frac{2}{5} \div 7 = \frac{22}{5} \div \frac{7}{1} = \frac{22}{5} \times \frac{1}{7} = \frac{22}{35}$

To add or subtract mixed numbers:

- Change to improper fractions.
- Add or subtract the fractions.
- Change answer back into a mixed number, if necessary.

Example: $5\frac{1}{4} + 6\frac{2}{3} = \frac{21}{4} + \frac{20}{3} = \frac{63}{12} + \frac{80}{12} = \frac{143}{12} = 11\frac{11}{12}$

Concept #2: Decimals

To determine which of 2 decimals is larger:

- Write the decimals so that they have the same number of digits (add zeros to the end).
- Start at the left and compare. The larger number will have the larger digit.

Example: $.257 \underline{\hspace{1cm}} .31$ The answer would be $.257 < .31$ because $.257 < .310$.

To round a decimal:

- Locate the place for which the round off is required.
- Compare the first digit to the right of this place to 5.
- If this is less than 5, drop it and all the digits to the right of it.
- If this is greater than 5, increase the rounded digit by one and drop all digits to the right.

Example: Round 1.5725 to the (a) nearest hundredth and (b) nearest thousandth.
Solution: (a) 1.57 and (b) 1.573

To add or subtract decimals:

- Write the numbers vertically and line up the decimal points. If needed, add zeros to the right of the decimal digits.
- Add or subtract as with whole numbers.
- Align the decimal point in the answer with the other decimal points.

Example: Add. $3.65 + 12.2 + .51$

$$\begin{array}{r} 3.65 \\ 12.20 \\ + .51 \\ \hline 16.36 \end{array}$$

To multiply decimals:

- Multiply the whole numbers.
- Determine the sum of decimal places in the numbers.
- Insert the decimal into the answer. It should be in the spot that equals the sum from above step. (Insert zeros to the left, if necessary.)

Example: Multiply $0.0023 \times 0.14 = .000322$ The answer must have a total of six numbers behind the decimal because the first number had four and the second had two.

To divide decimals:

- Make the divisor a whole number by moving the decimal point.
- Move the decimal point in the dividend to the right the same number of places.
- Place the decimal point in the answer directly above the division symbol.
- Divide as with whole numbers.

Example: Divide 0.168 by 0.05. $0.05 \overline{)0.168} = 5 \overline{)16.80}$

Concept #3: Percents

Definition:

% means "per 100" or "out of 100"

Example: 87% means $\frac{87}{100}$ or 87 out of 100.

To convert a percentage to a fraction or decimal:

- Divide by 100
- Shortcut: move the decimal place two places to the left.

Examples: Convert 32% to a fraction. $32\% = \frac{32\%}{100\%} = \frac{32}{100} = \frac{8}{25}$

Convert 2.5% to a decimal. $2.5\% = \frac{2.5\%}{100\%} = \frac{2.5}{100} = .025$

To convert a fraction or decimal to a percentage:

- Multiply by 100
- Shortcut: move the decimal place two places to the right.

Examples: Convert $\frac{3}{5}$ to a percentage. $\frac{3}{5} \times 100\% = \frac{3}{5} \times \frac{100}{1} \% = 60\%$

Convert 1.4 to a percent. $1.4 \times 100\% = 140\%$

To solve percent equations:

- Change the percent into a decimal or fraction.
- Translate the question into an equation. Hint: "is" means "=", "of" means "multiply" and "what" means "x".
- Solve the equation for the variable.

Example: Fourteen is 25% of what number?

Solution:

$$14 = .25 \times N$$

$$\frac{14}{.25} = \frac{.25}{.25} N \quad \text{Therefore, 14 is 25\% of 56.}$$

$$56 = N$$

To solve a percent increase or percent decrease problem:

- Percent increase: $\frac{\text{New} - \text{Original}}{\text{Original}} \times 100$
- Percent decrease: $\frac{\text{Original} - \text{New}}{\text{Original}} \times 100$

Example: If 68,000 were increased to 78,500, find the percent increase.

$$\frac{78500 - 68000}{68000} \times 100 = 15.4\%$$

Concept #4: Various Word Problems

To solve problems travel:

- Use the formula: Distance = Rate x Time

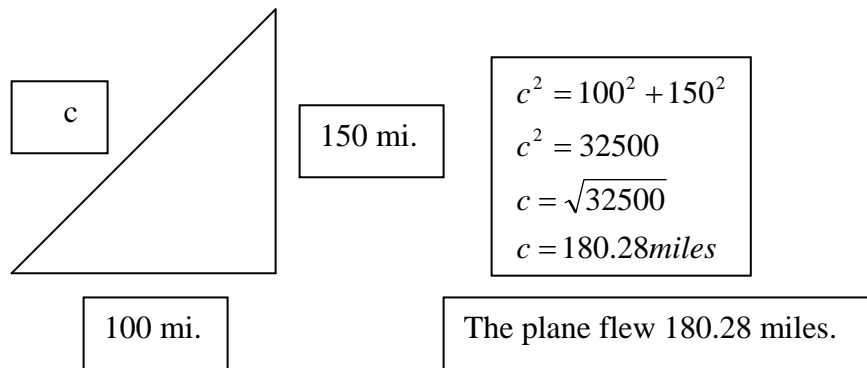
Example: How long does it take a car traveling 60 miles per hour to travel 245 miles?

$$\begin{aligned}d &= rt \\245 &= 60t \\ \frac{245}{60} &= \frac{60t}{60} \\4.08\text{hours} &= t\end{aligned}$$

Right triangle word problems:

- Use the following formula: Pythagorean Theorem: $a^2 + b^2 = c^2$.
- Also, known as $\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$

Example: A plane flew in a straight line to a point 100 miles east and 150 miles north from where it began. How far did the plane travel?



Concept #5: Measurement

Converting from one American Unit to Another:

- To convert units, multiply by a unity fraction. Set up the fraction so that the units will cancel appropriately.

Example: Convert 45 inches to feet. $45\text{in} \times \left(\frac{1\text{ft}}{12\text{in}}\right) = 3.75\text{ft}$

Performing Arithmetic with Measurements:

- Add like units

Example: Add. $4\text{ ft.}6\text{ in.} + 7\text{ ft.}10\text{ in.} = 11\text{ ft.}16\text{ in.} = 12\text{ ft.}4\text{ in.}$ (16 inches=1 ft. 4 in.)

Subtract. $7\text{ lb.}5\text{ oz.} - 3\text{ lb.}8\text{ oz.} = 3\text{ lb.}13\text{ oz.}$ (When subtracting, borrowing is sometimes necessary. Change 7 lbs.5 oz. to 6 lbs. 21 oz.)

Multiply. $2\text{ qt.}1\text{ pt.} \times 5 = 10\text{ qt.}5\text{ pt.} = 12\text{ qt.}1\text{ pt.}$ (5 pts. = 2 qts. 1 pt.)

Converting from one metric unit to another.

- Use the order of metric conversions:
- kilo, hecto, deka, unit, deci, centi, milli
- km hm dam m dm cm mm

Example:

4200 cm = _____ m. Move two decimal places to the left.
Therefore, the solution is 42 meters.

4.3 L = _____ cL. Move two decimal places to the right.
Therefore, the solution is 430 cL.

Translating phrases to algebraic expressions:

- | | |
|---|------------|
| • Hints: is, equals, are, results | "=" |
| • sum, plus, increased by, greater than, more than, exceeds, total of | "+" |
| • difference, minus, decreased by, less, subtracted from, reduced by, the remainder | "-" |
| • product, multiplied, twice, times, of | "x" |
| • quotient, divided by, ratio, per | "÷" |
| • exponent, power, squared, cubed | "exponent" |

Example:

- | | |
|--------------------------------------|---------------|
| 1. a number plus seven results in 10 | $x + 7 = 10$ |
| 2. the sum of a number and two | $x + 2$ |
| 3. seven subtracted from five | $5 - 7$ |
| 4. three less than a number | $x - 3$ |
| 5. twice a number | $2x$ |
| 6. the ratio of five to nine | $\frac{5}{9}$ |
| 7. two cubed | 2^3 |

8. a number to the fifth power x^5
9. five times the sum of a number and three $5(x + 3)$

Concept #6: Sets of Numbers

Integers

- All positive and negative whole numbers and zero
- Examples: -100, 20, 0, -321, -1, 45

Rational Numbers

- All terminating or repeating decimals
- Examples: .25, $\frac{3}{4}$, $\overline{.6}$

Irrational Numbers

- All non-terminating, non-repeating decimals
- Examples: $\sqrt{2}$, π

Prime Numbers

- Positive integer greater than 1 with no factors other than itself and 1
- Examples: 5, 17, 29, 41

Real Numbers

- The numbers that can be plotted on a number line.
- Example: $\frac{5}{3}$

Absolute Value

- The distance that a number is from zero on a number line.
- Examples: $|2| = 2$, and $|-5| = 5$, and $|0| = 0$

Concept #7: Operations on Integers

Addition:

- If the numbers have the same sign, add the numbers and take the sign.
- If the numbers have opposite signs, subtract the smaller absolute value from the larger and attach the sign of the larger.

Examples:

$$5 + 12 = 17$$

$$-4 + (-10) = -14$$

$$(-3) + (-7) + (-10) = -20$$

$$5 + (-12) = -7$$

$$(-7) + 3 = -4$$

$$-2 + 10 = 8$$

Subtraction:

- Add the opposite of the second number.

Examples:

$$7 - 15 = 7 + (-15) = -8$$

$$4 - 5 = 4 + (-5) = -1$$

$$7 - (-3) = 7 + 3 = 10$$

Multiplication and Division

- If the signs are the same, the answer will be positive.
- If the signs are different, the answer will be negative.

Examples:

$$(-6) \div (-2) = 3$$

$$(-12) \div (-4) = 3$$

$$(-3)(-2) = 6$$

$$(-5)(2) = -10$$

$$\frac{-15}{3} = -5$$

Exponents

- Multiply the base times itself the number of times given by the exponent.

Examples:

$$(-2)^3 = (-2)(-2)(-2) = -8$$

$$2^5 = (2)(2)(2)(2)(2) = 32$$

Order of Operations: To evaluate an expression with many different operations, use the following order: P E M D A S "Please excuse my dear aunt Sally"

- P: Parentheses - Start with the innermost symbol, and work outward.
- E: Exponents - Evaluate all exponents.
- M/D: Multiply or Divide - In order from left to right, multiply or divide.
- A/S: Add or Subtract - In order from left to right, add or subtract.

Example:

$$16 \div 2^3 - 4(3 - |5 - 7|) + 5$$

$$16 \div 2^3 - 4(3 - |-2|) + 5$$

$$16 \div 2^3 - 4(3 - 2) + 5$$

$$16 \div 2^3 - 4(1) + 5$$

$$16 \div 8 - 4(1) + 5$$

$$2 - 4(1) + 5$$

$$2 - 4 + 5$$

$$-2 + 5$$

$$3$$

Concept # 8: Algebraic Expressions

Evaluating Algebraic Expressions: To evaluate an algebraic expression with given values for the variables:

- Replace every variable with the appropriate real number.
- Use parentheses when substituting a negative number for a variable.
- Use the order of operations to evaluate the resulting expression.

Example: Evaluate $y^2 - x + 2z + z^3$ when $x = -3$, $y = -5$, and $z = 2$.

$$(-5)^2 - (-3) + 2(2) + 2^3$$

$$25 + 3 + 4 + 8$$

$$28 + 4 + 8$$

$$32 + 8$$

$$40$$

Simplifying Algebraic Expressions

- Starting with the innermost set of parentheses, remove the grouping symbols. Usually the distributive property and/or rules of exponents must be used in this step.
- Combine like terms by adding the coefficients of terms having the same variable factor.

Example: Simplify:

$$(5x)^2 + 4[x^2 - (2x - 5)]$$

$$(5x)^2 + 4[x^2 - 2x + 5]$$

$$(5x)^2 + 4x^2 - 8x + 20$$

$$25x^2 + 4x^2 - 8x + 20$$

$$29x^2 - 8x + 20$$

Concept # 9: Ratios, Rates, and Proportions

Ratio: A ratio compares two quantities that have the same units.

Example: 2 feet to 7 feet

Rate: A rate compares two quantities that have different units.

Example: 60 miles per hour

Proportion: A proportion is an equation which states that two ratios or rates are equal.

Determining the truth of a proportion:

- If the cross products are equal, then the proportion is true.

Example: Is $\frac{2}{7} = \frac{4}{9}$? The cross products would be $2 \times 9 = 18$ and $4 \times 7 = 28$.

Therefore, the proportion is not true since 18 does not equal 28.

Solving Proportions:

- Find the cross products.
- Divide by the number beside the variable.

Example: Solve $\frac{2}{x} = \frac{3}{12}$.

$$24 = 3x$$

$$\frac{24}{3} = \frac{3x}{3}$$

$$8 = x$$

Concept # 10: Linear Equations

Solving Linear Equations:

- Remove all parentheses.
- Add like terms on separate sides of equation.
- Move all variables by adding or subtracting to one side.
- Move all constants by adding or subtracting to other side.
- Isolate the variable by performing the same operation on both sides of the equation.

Example:

$$4(x+2) + 5x = 6(x+4)$$

$$4x + 8 + 5x = 6x + 24$$

$$9x + 8 = 6x + 24$$

$$9x - 6x + 8 = 6x - 6x + 24$$

$$3x + 8 = 24$$

$$3x + 8 - 8 = 24 - 8$$

$$3x = 16$$

$$\frac{3x}{3} = \frac{16}{3}$$

$$x = \frac{16}{3}$$

Solving application problems using a linear equation:

- Write verbal equivalence containing the quantities involved in the problem.
- Substitute given values for known quantities.
- Use a variable to represent the unknown quantity.
- Solve the resulting equation.
- Answer the original question.

Example: A person has 90 coins in quarters and dimes with a combined value of \$16.80. Determine the number of coins of each type.

Value of quarters + Value of dimes = total value

$$.25(\# \text{ of quarters}) + .10(\# \text{ of dimes}) = 16.80$$

$$.25x + .10(90-x) = 16.80$$

$$.25x + 9 - .10x = 16.80$$

$$.15x + 9 = 16.80$$

$$.15x + 9 - 9 = 16.80 - 9$$

$$.15x = 7.80$$

$$x = 52$$

So, there were 52 quarters and $90-52 = 38$ dimes.

Concept # 11: Exponents

Positive integer exponent: This number indicates how many times the base is to be multiplied.

Example:

$$3^4 = 3 \cdot 3 \cdot 3 \cdot 3 = 81$$

$$(-1)^5 = (-1)(-1)(-1)(-1)(-1) = -1$$

Negative integer exponent: If this number is applied to a base, it is equal to the reciprocal of the base raised to the opposite exponent.

Example:

$$2^{-3} = \frac{1}{2^3} = \frac{1}{(2)(2)(2)} = \frac{1}{8}$$

$$x^{-5} = \frac{1}{x^5}$$

Zero exponent: If this is applied to any base (except 0), the resulting answer will be 1.

Example:

$$5^0 = 1$$

$$x^0 = 1$$

$$(-2)^0 = 1$$

Fractional Exponent: This indicates that a radical should be applied to the base. The numerator of the exponent denotes the power to which the base is raised, and the denominator of the exponent denotes the root to be taken.

Example:

$$8^{\frac{2}{3}} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$$

or

$$8^{\frac{2}{3}} = (\sqrt[3]{8})^2 = 2^2 = 4$$

Moving Factors: A factor can be moved from the numerator of a fraction to the denominator (or vice versa) by changing the sign of the exponent.

Example:

$$\frac{x^4 y^{-3}}{z^5} = \frac{x^4}{y^3 z^5}$$

Notice how the "y" factor was moved to the denominator by changing the -3 to a positive 3.

More examples of exponents:

$$\left(\frac{2}{3}\right)^3 = \frac{2^3}{3^3} = \frac{8}{27}$$

and

$$(x+1)^2 = (x+1)(x+1) = x^2 + x + x + 1 = x^2 + 2x + 1$$

and

$$(3xy)^3 = 3^3 x^3 y^3 = 27x^3 y^3$$

and

$$x^2 \cdot x^5 = x^7 \text{ (add _exponents _with _like _bases)}$$

and

$$\frac{x^8}{x^3} = x^5 \text{ (subtract _exponents _with _like _bases)}$$

Practice Problems

The answers will follow each section of practice problems.

Whole Number Practice

- Round to the given place.
 - 3973 to hundreds
 - 253687 to ten-thousands
- Add
 - $68421 + 985 + 6711$
 - $77 + 886 + 32785 + 8$
- Subtract 4867 from 5223
 - 5820 minus 625 equals what number?
 - Find the difference between 7042 and 6134.
- Multiply
 - 7024×352
 - 7432×504
- Divide
 - $30572 \div 15$
 - $98521 \div 762$
- Evaluate each expression using the order of operations.
 - $3 + 5(6-1)$
 - $\frac{3(2+5)}{3^2 - 2}$
 - $7 - 2^3 \div 2 + 5$
- Applications
 - Mr. Robinson drove from Los Angeles to Chicago. He drove 420 miles on Monday, 365 miles on Tuesday, and 382 miles on Wednesday. If the total distance is 1850, how much further does he have to drive?
 - Write down 4617, multiply it by 12, divide the product by 9, add 365 to the quotient, and subtract 5521 from the sum. What is the result?
 - What number multiplied by 86 will give the same product as 163 multiplied by 430?
 - The first of four numbers is 3125, the second is greater than the first by 5108, the third is equal to the sum of the first and the second, and the fourth is equal to the sum of the third and the first. What is the sum of the four numbers?
 - The diameter of Mercury is 2967 miles, the diameter of Saturn is 24 times that of Mercury, and the diameter of the Sun is 12 times that of Saturn. What is the Sun's diameter?
 - How many 16-inch long boards can be cut from a board that is 15 feet long?
 - How many hours are there in one year?

Answers to Whole Number Practice

1. a.) 4000 b.) 250000
2. a.) 76117 b.) 33756
3. a.) 356 b.) 5195 c.) 908
4. a.) 2,472,448 b.) 3,745,728
5. a.) 2038 R 2 b.) 129 R 223
6. a.) 28 b.) 3 c.) 8
7. a.) 683 miles b.) 1000 c.) 815 d.) 37199
e.) 854,496 miles f.) 11 boards g.) 8760

Integer Practice

1. $-5(-1+6)$
2. $\frac{8(-3)}{-6}$
3. $\frac{-380}{38} + \frac{380}{-38}$
4. $(2)(-2) + (5)(6)$
5. $\frac{-15}{15} + \frac{150}{15}$
6. $(-1)(-7)^2$
7. $(-3)(7)(-2)(5)$
8. $(-2)^4$
9. $(-3)(-12)(-1)$
10. $\frac{-60}{-3} + \frac{-48}{4}$
11. $-1(-6) + 8(-2)$
12. $(-9)^2(-1)^5$
13. $(-8)(-1)(4)(-3)$
14. $\frac{9(-4)}{-2}$
15. $\frac{-32}{2} + \frac{-75}{-15}$
16. $-7 + 8 + (-9) + 10$
17. $-5 - 16$
18. $30 + (3 - 5)$
19. $2 - (1 - 9)$
20. $(-22 + 33) - 11$
21. $-10 - (8 - 10)$

22. $(6 - 1) - (-12 + 2)$
23. $(-15 - 15) - (15 - 13)$
24. $(3 - 7) - (9 - 12)$
25. $(-25 + 50) - (-4 - 6)$
26. $-2 - 5 - 3$
27. $-18 + 14 - 2$

Answers to Integer Practice

- | | |
|---------|----------|
| 1. - 25 | 14. 18 |
| 2. 4 | 15. - 11 |
| 3. -20 | 16. 2 |
| 4. 26 | 17. - 21 |
| 5. 9 | 18. 28 |
| 6. -49 | 19. 10 |
| 7. 210 | 20. 0 |
| 8. 16 | 21. - 8 |
| 9. -36 | 22. 15 |
| 10. 8 | 23. - 32 |
| 11. -10 | 24. - 1 |
| 12. -81 | 25. 35 |
| 13. -96 | 26. - 10 |
| 14. 18 | 27. - 6 |

Fraction Practice

1. Reduce each fraction to lowest terms.

a. $\frac{21}{36}$	b. $\frac{14}{35}$	c. $\frac{9}{216}$
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2. Write each improper fraction as a mixed number.

a. $\frac{21}{4}$	b. $\frac{49}{5}$	c. $\frac{106}{9}$
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3. Write each mixed number as an improper fraction.

a. $5\frac{5}{7}$	b. $6\frac{3}{4}$	c. $10\frac{3}{11}$
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4. Add. Reduce your answers.

a. $\frac{2}{5} + \frac{3}{8}$	b. $\frac{2}{3} + \frac{5}{16} + \frac{1}{4}$	c. $9\frac{2}{3} + 5\frac{5}{6}$
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5. Subtract. Reduce your answers.

a. $\frac{4}{9} - \frac{1}{8}$

b. $9 - \frac{11}{12}$

c. $11\frac{1}{5} - 6\frac{2}{3}$

6. Multiply. Reduce.

a. $\frac{2}{5} \cdot \frac{3}{8}$

b. $\frac{1}{5} \cdot \frac{7}{8} \cdot \frac{5}{14}$

c. $9\frac{3}{7} \cdot 4\frac{2}{3}$

7. Divide. Reduce

a. $\frac{2}{3} \div \frac{6}{12}$

b. $5\frac{5}{8} \div 4$

c. $7\frac{3}{5} \div 4\frac{3}{10}$

8. Applications

a.) Fred Thompson worked $2\frac{2}{3}$ hours of overtime on Monday, $1\frac{1}{4}$ hours on

Wednesday, $1\frac{1}{3}$ hours on Friday, and $6\frac{3}{4}$ hours on Saturday. If overtime pay is \$22 per hour, what did Fred receive in overtime pay?

b.) The parents of Harper Junior High School choir members are making robes for the choir. Each robe requires $2\frac{5}{8}$ yards of material at \$8 per yard.

How much will 24 choir robes cost?

c.) A fifteen-foot board is cut into $3\frac{1}{2}$ foot long pieces for a bookcase. After as many pieces are cut, how long is the remaining piece?

Fraction Practice Answers

1. a. $\frac{7}{12}$

b. $\frac{2}{5}$

c. $\frac{1}{24}$

2. a. $5\frac{1}{4}$

b. $9\frac{4}{5}$

c. $11\frac{7}{9}$

3. a. $\frac{40}{7}$

b. $\frac{27}{4}$

c. $\frac{113}{11}$

4. a. $\frac{31}{40}$

b. $\frac{59}{48}$

c. $15\frac{1}{2}$

5. a. $\frac{23}{72}$
b. $8\frac{1}{12}$
c. $4\frac{8}{15}$

7. a. $\frac{4}{3}$
b. $1\frac{13}{32}$
c. $1\frac{33}{43}$

6. a. $\frac{3}{20}$
b. $\frac{1}{16}$
c. 44

8. a. \$264
b. \$504
c. 1 foot

Decimal Practice

1. Add or Subtract

- a. $3.682 + 9.81 + 0.036$
b. $87 + 1.042 + 19.876 + 8.6$
c. $69.68 - 27.466$
d. $39 - 18.46$

2. Multiply

- a. 0.074×0.81
b. 3.18×12
c. 89.11×0.0001

3. Divide

- a. $35.4 \div 6$
b. $3.8 \div 1.7$ Round to 2 decimal places.
c. $0.52 \div 0.074$ Round to 2 decimal places.

4. Write as a decimal. Round to two places.

- a. $\frac{1}{6}$
b. $\frac{2}{70}$
c. $8\frac{2}{3}$

5. Write as a fraction or mixed number.

- a. 0.45
b. 0.025
c. 13.032

6. Applications

- a. Nancy buys a shirt for \$41.95 and a blouse for \$29.95. How much change will she receive from four \$20 bills?
- b. Lynn had \$43.91 in her checking account at the beginning of the month. During the month, she made deposits of \$100 and \$312.45. She wrote checks for \$174.95, \$114.25, \$81.11, \$30, and \$9.50. What is the balance at the end of the month?
- c. Lean ground round cost \$3.29 per pound. What will a package weighing 1.81 pounds cost to the nearest cent?

Decimal Practice Answers

- | | | | |
|-------|----------|-------|-------------------|
| 1. a. | 13.528 | 4. a. | 0.17 |
| b. | 116.518 | b. | 0.03 |
| c. | 42.214 | c. | 8.67 |
| d. | 20.54 | | |
| 2. a. | 0.05994 | 5. a. | $\frac{9}{20}$ |
| b. | 38.16 | b. | $\frac{1}{40}$ |
| c. | 0.008911 | c. | $13\frac{4}{125}$ |
| 3. a. | 5.9 | 6. a. | \$ 8.10 |
| b. | 2.24 | b. | \$ 46.55 |
| c. | 7.03 | c. | \$ 5.95 |

Ratios, Rate, and Proportion Practice

1. a. Write the ratio $4\frac{1}{2}$ to $6\frac{3}{4}$ in simplest form.
- b. Write as a ratio in simplest terms 2 feet 2 inches to 1 yard.
- c. Write as a rate: 175 miles in 4 hours.
2. Determine if each proportion is true or false.
 - a. $\frac{9}{72} = \frac{1}{32}$
 - b. $\frac{3.6}{0.12} = \frac{72}{24}$
 - c. $\frac{16lbs.}{12days} = \frac{20lbs.}{14days}$

3. Solve the proportions.

a. $\frac{x}{6} = \frac{3.5}{10.5}$

b. $\frac{2}{\frac{3}{5}} = \frac{6}{x}$

c. $\frac{10}{3} = \frac{x}{99}$

4. Applications

a. Which is the better buy in dish detergent, 20 ounces for \$1.39 or 12 ounces for \$0.89?

b. If Jane can make 3 pairs of curtains from 10 yards of material, how much material is needed for 4 pairs of curtains?

c. Stan can jog 2.5 miles in 22.5 minutes. At that rate, how long will it take him to jog 8 miles?

Ratio, Rate, and Proportion Practice Answers

1. a. $\frac{2}{3}$

b. $\frac{13}{18}$

c. 43.75 miles/hour

2. a. true

b. false

c. false

3. a. 2

b. $\frac{45}{8}$

c. 330

4. a. 20 ounces

b. $13\frac{1}{3}$ yards

c. 72 minutes

d. 1440 men

Percent Practice

1. Write as a fraction.

a. 6%

b. 40%

c. 175%

2. Write as a decimal.

a. 56%

b. 3.2%

c. 560%

3. Write as a percent.

d. .6

e. 1.07

f. $\frac{3}{4}$

g. $1\frac{1}{4}$

3. Solve the proportion.

a. What is 10.7% of 485?

b. 26% of 19.5 is what?

c. 5 is what percent of 2000?

d. What percent of 12 is 24?

e. 4.8 is 15% of what?

f. 78% of what is 3.9?

4. Applications

a. If the interest rate of a charge card is $1\frac{1}{4}\%$ on the unpaid balance and your unpaid balance this month is \$312, how much interest will you pay this month?

b. If the baseball team wins 78 of the 114 games that it plays, what percent has it lost?

c. Jenkins Appliance has a washing machine regularly priced at \$350 on sale for \$297.50. What is the discount rate?

d. Susan borrowed \$500 for 6 months at an annual rate of 21%. How much interest did she pay on this loan?

Percent Practice Answers

1. a. $\frac{3}{50}$

b. $\frac{2}{5}$

c. $1\frac{3}{4}$

2. a. .56

b. .032

c. 5.60

3. a. 60%

b. 107%

c. 75%

d. 125%

4. a. 51.895

b. 5.07

c. 0.25%

d. 200%

e. 32

f. 5

5. a. \$3.90

b. 31.6%

c. 15%

d. \$52.50

Measurement Practice

- Convert the following American Measurements
 - 2.5 ft. = _____ in.
 - 42 oz. = _____ lb.
 - 18 pt. = _____ gal.
- Perform the following operations.
 - 3 ft. 9 in. + 5 ft. 6 in.
 - 3 hr. 20 sec. - 1 hr. 37 min. 43 sec.
 - 5 lb. 6 oz. \times 8
 - Find the quotient 7lb. 5 oz. and 3
- Convert the following metric measurements.
 - 0.450 g. = _____ mg.
 - 0.37 cm. = _____ m.
 - 4 kg. 5 dag. = _____ g.

Measurement Practice Answers

- 30
 - $2\frac{5}{8}$
 - $2\frac{1}{4}$
- 9 ft. 3 in.
 - 1 hr. 22 min. 37 sec.
 - 43 lb.
 - 2 lb. 7 oz.
- 450 mg
 - .0037m
 - 4050g

Powers, Roots, and Order of Operations Practice

- Evaluate the following powers.
 - 3^4
 - $(.1)^5$
 - $\left(\frac{2}{3}\right)^3$
- Evaluate the following roots.
 - $\sqrt{121}$
 - $\sqrt{400}$
 - $\sqrt{\frac{9}{16}}$

3. Evaluate the following.

- a. $7 + 3 \cdot 4$
- b. $(3^3 - 14) \div 2 + 3 \cdot 6$
- c. $\sqrt{9} + 2(6 + 4) \div 5$
- d. $13 - [5 - (5 - 3)]$
- e. $14 - \{2[5 - (5 - 3)] + 3\}$
- f. $\left(\frac{5}{6}\right)^2 \div \left(\frac{5}{12} + \frac{2}{3}\right)$

Powers, Roots, and Order of Operations Practice Answers

- | | | | |
|-------|----------------|-------|-----------------|
| 1. a. | 81 | 3. a. | 19 |
| b. | 0.00001 | b. | 24.5 |
| c. | $\frac{8}{27}$ | c. | 7 |
| 2. a. | 11 | d. | 10 |
| b. | 20 | e. | 5 |
| c. | $\frac{3}{4}$ | f. | $\frac{25}{39}$ |

Translating Expressions Practice

Translate each of the following.

- 1. 9 less than a number
- 2. 4 times a number, plus 9
- 3. 9 diminished by 4 times a number
- 4. one-fourth of a number
- 5. 9 times a number, decreased by 4
- 6. 4 more than 9 times a number
- 7. 9 times a number, increased by 4 times the number
- 8. 2 times a number, increased by 8
- 9. 2 times the sum of a number and 8
- 10. 3 more than 8 times a number
- 11. 8 times the sum of a number and 3
- 12. 3 times the sum of a number and 8
- 13. two-thirds of a number
- 14. 3 times the sum of twice a number and 8

Translating Expressions Practice Answers

- | | |
|-------------------|--------------------|
| 1. $x - 9$ | 8. $2x + 8$ |
| 2. $4x + 9$ | 9. $2(x + 8)$ |
| 3. $9 - 4x$ | 10. $8x + 3$ |
| 4. $\frac{1}{4}x$ | 11. $8(x + 3)$ |
| 5. $9x - 4$ | 12. $3(x + 8)$ |
| 6. $4 + 9x$ | 13. $\frac{2}{3}x$ |
| 7. $9x + 4x$ | 14. $3(2x + 8)$ |

Solving Linear Equations Practice

Solve the following equations.

- $3(5x - 4) = 8x + 2$
- $9(n + 3) = 7n - 3$
- $2(10 - 6x) = x - 8x$
- $5a + 4(3a - 8) = 4 + 13a$
- $2y + 18 = 12 - 6(y + 7)$
- $x - (5 - 3x) = 7x + 4$
- $8(m - 5) = 2(3m - 8)$
- $-4(3 - 6d) = 9(2d - 2)$

Solving Linear Equations Practice Answers

- 2
- 15
- 4
- 9
- 6
- 3
- 12
- 1