

Unit 1 Test Study Guide (The Real Numbers)

Name: Key
Date: _____ Per: _____

Topic 1: Integers & Absolute Value

Directions: Find each sum, difference, product, or quotient.

1. $-10 + 16 = 6$ 2. $3 - 24 = -21$ 3. $-15 + (-11) = -26$ 4. $-8 \cdot -9 = 72$ 5. $\frac{-57}{3} = -19$

Directions: Simplify each expression.

6. $|-14|$ 7. $|15| - |-9|$ 8. $|-13 + 2|$ 9. $|7 - (-10)|$

14 6 11 17

Topic 2: Fractions, Decimals, & Percents

Directions: Complete the chart below.

	Fraction	Decimal	Percent
10.	$\frac{37}{50}$	0.74	74%
11.	$\frac{1}{25}$	0.04	4%
12.	$-\frac{2}{9}$	-0.2	22.22%
13.	$1\frac{3}{5}$	1.6	160%

Directions: Find each sum, difference, product, or quotient.

14. $-1\frac{3}{4} + 1\frac{1}{6}$
 $-\frac{7}{4} + \frac{7}{6}$
 $-\frac{21}{12} + \frac{14}{12} = -\frac{7}{12}$

15. $-5\frac{1}{12} - 3\frac{2}{3}$
 $-\frac{61}{12} - \frac{11}{3}$
 $-\frac{61}{12} - \frac{44}{12} = -\frac{105}{12} = -\frac{35}{4}$

16. $2\frac{1}{3} - (-4\frac{5}{6})$
 $\frac{7}{3} + \frac{29}{6}$
 $\frac{14}{6} + \frac{29}{6} = \frac{43}{6} = 7\frac{1}{6}$

17. $\frac{2}{5} \cdot -\frac{1}{6}$
 $\frac{2}{5} \cdot -\frac{1}{6} = -\frac{1}{15}$

18. $1\frac{1}{2} \div 8$
 $\frac{3}{2} \div 8$
 $\frac{3}{2} \cdot \frac{1}{8} = \frac{3}{16}$

19. $-3\frac{4}{7} \div -1\frac{1}{14}$
 $-\frac{25}{7} \div -\frac{15}{14}$
 $\frac{5 \cdot 25}{17} \cdot \frac{14}{15} = \frac{10}{3} = 3\frac{1}{3}$

20. How many flags can be made from $116\frac{1}{4}$ yards of fabric if each flag requires $2\frac{2}{9}$ yards?

$116\frac{1}{4} \div 2\frac{2}{9}$
 $\frac{465}{4} \div \frac{20}{9} = \frac{465}{4} \cdot \frac{9}{20} = \frac{837}{16} = 52\frac{7}{16}$ So 52 Flags

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21. Melissa ran $6\frac{2}{5}$ miles north, $2\frac{3}{4}$ west, and $2\frac{1}{3}$ miles south. How far did she run?

$$\begin{array}{r} 32 \\ \times 12 \\ \hline 64 \\ 326 \\ \hline 384 \end{array}$$

$$\frac{32}{5} + \frac{11}{4} + \frac{7}{3} = \frac{384}{60} + \frac{165}{60} + \frac{140}{60} = \frac{689}{60} = 11\frac{29}{60} \text{ mi}$$

22. At the beginning of his diet, Jack weighed $240\frac{4}{5}$ pounds. At the end of the diet, he weighed $\frac{3}{4}$ his original weight. What did Jack weigh at the end of the diet?

$$\begin{array}{r} 240 \\ \times 5 \\ \hline 1200 \end{array}$$

$$\frac{1204}{5} \cdot \frac{3}{4} = \frac{903}{5} = 180\frac{3}{5} \text{ lbs.}$$

23. A brownie recipe calls for $1\frac{2}{3}$ cups of sugar. If you are making $1\frac{1}{2}$ times the recipe, how much more sugar will you need?

$$\frac{5}{3} \cdot \frac{3}{2} = \frac{5}{2} = 2\frac{1}{2} \text{ cups}$$

$$\begin{array}{r} 2\frac{1}{2} \\ - 1\frac{2}{3} \\ \hline 1\frac{1}{6} \\ + \frac{1}{6} \\ \hline 1\frac{2}{6} \\ = \frac{1}{3} \text{ cups} \end{array}$$

Topic 3: Exponents, Roots, & Scientific Notation

Directions: Evaluate each expression.

24. $3^7 \cdot 8^2$
 $2187 \cdot 64 = 139,968$

25. $(-2)^4 \cdot (-6)^3$
 $16 \cdot 216 = 3456$

26. $(\frac{3}{10})^3 \cdot 20^2$
 $\frac{27}{1000} \cdot \frac{400}{1} = \frac{54}{5} = 10\frac{4}{5}$

Directions: Rewrite each expression using positive exponents. Simplify if possible.

27. 2^{-5}
 $\frac{1}{2^5} = \frac{1}{32}$

28. $a^0 b^{-3} c^{-1}$
 $\frac{1}{b^3 c^1}$

29. $8^{-2} \cdot 6^3$
 $\frac{216}{64} = 3\frac{3}{8}$

Directions: Find each square root. Round to the nearest tenth if necessary.

30. $\sqrt{289}$
 17

31. $-\sqrt{16}$
 -4

32. $\sqrt{\frac{4}{81}}$
 $\frac{2}{9}$

33. $-\sqrt{90}$

Directions: Identify the two consecutive integers in which each square root lies between.

34. $\sqrt{18}$
 $4 \text{ + } 5$

35. $\sqrt{360}$
 $18 \text{ + } 19$

36. $-\sqrt{195}$
 $-14 \text{ + } -13$

$$\begin{array}{r} 29 \\ \times 3 \\ \hline 2187 \end{array}$$

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Directions: Find each cube root.

37. $\sqrt[3]{729}$ 9	38. $\sqrt[3]{-27}$ -3	39. $\sqrt[3]{2,744}$ 14
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Directions: Write each value in scientific notation.

40. 5,028 5.028×10^3	41. 0.000000216 2.16×10^{-7}
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Directions: Write each value in standard form.

42. 9.7×10^{-2} 0.097 0.097	43. 3.42×10^5 342,000
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Topic 4: Comparing & Ordering Numbers (All Formats!)

Directions: Order #44 from least to greatest, then order #45 from greatest to least.

44. $2^9, 5.9 \times 10^2, 9^3, 5^4, 6.81 \times 10^1$
 512, 590, 729, 625, 68.1

$6.81 \times 10^1, 2^9, 5.9 \times 10^2, 5^4, 9^3$

45. $\sqrt{10}, \frac{1}{3}, 3\%, 2^{-2}, 3.4 \times 10^{-2}, \frac{2}{5}$
 10, 0.33, 0.03, 0.15, 0.034, 0.4

$\sqrt{10}, \frac{2}{5}, \frac{1}{3}, 2^{-2}, 3.4 \times 10^{-2}, 3\%$

Topic 5: Order of Operations & Evaluating Expressions

Directions: Evaluate each expression.

46. $(19-7)^2 - 12 \div 3(2)$ $12^2 - 12 \div 3(2)$ $144 - 4(2)$ $144 - 8$ 136	47. $14 - (3^4 - \sqrt[3]{125}) \div 4$ $14 - (81 - 5) \div 4$ $14 - 76 \div 4$ $14 - 19$ -5
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48. $3(5 - -24) - (\sqrt{361} + 2^6)$ $3(5 - 24) - (19 + 64)$ $3(-19) - 83$ $-57 - 83 = -140$ -140	49. $\frac{27 - (3^2 - 2 \cdot 5)}{8 - 6^2}$ $\frac{27 - (9 - 10)}{8 - 36}$ $\frac{27 - (-1)}{-28} = \frac{28}{-28} = -1$ -1
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Directions: Evaluate each expression given the variable replacements.

50. $8xy - 7y^2$ (if $x = -2$ and $y = -4$)

$$8(-2)(-4) - 7(-4)^2$$

$$8(8) - 7(16)$$

$$64 - 112$$

$$\boxed{-48}$$

51. $\frac{3}{2}a - ab + 1$ (if $a = \frac{5}{6}$ and $b = \frac{3}{10}$)

$$1\frac{3}{2}\left(\frac{5}{6}\right) - \frac{1}{2}\left(\frac{5}{6}\right)\left(\frac{3}{10}\right) + 1$$

$$\frac{5}{4} - \frac{1}{4} + 1$$

$$\frac{4}{4} + 1 = 1 + 1 = \boxed{2}$$

Topic 6: The Real Number System

Directions: Name the **SMALLEST SUBSET** that contains each value.

52. $-\sqrt{256} = -16$
Integers \mathbb{Z}

53. $5^{-1} = \frac{1}{5}$
Rational \mathbb{Q}

54. $\sqrt{88}$
Irrational \mathbb{I}

55. $|-27| = 27$
Natural \mathbb{N}

56. $1\frac{9}{23}$
Rational \mathbb{Q}

57. $\sqrt{0} = 0$
Whole \mathbb{W}

Directions: Fill in the blanks with always, sometimes, or never.

58. Natural numbers are Always integers.

59. Negative numbers are Never whole numbers.

60. Square roots are sometimes rational numbers.

Topic 7: Properties

Directions: Name the property that justifies each statement.

61. $(-9+2) \cdot 0 = 0$

62. $x^2 \cdot (y^2 \cdot z^2) = (x^2 \cdot y^2) \cdot z^2$

63. $15 + 0 = 15$

64. $6(x+7) = 6x + 42$

65. $4 + (3+11) = 4 + (11+3)$

66. $\frac{1}{2} \cdot 2 = 1$

67. What is the additive inverse of $(-2m)$?

68. What is the multiplicative identity of $\frac{4}{5}$?

69. What is the additive identity of -9 ?

70. What is the multiplicative inverse of $\frac{2}{3}$?