

ASSIGNMENT 1

DYLAN ZWICK'S MATH 1010 CLASS

1. SECTION 1.1 - THE REAL NUMBER SYSTEM

Determining which of the real numbers in the set are:

- (1) natural numbers,
- (2) integers,
- (3) rational numbers,
- (4) irrational numbers.

$$\mathbf{1.1.1:} - \left\{ -6, -\sqrt{6}, -\frac{4}{3}, 0, \frac{5}{8}, \sqrt{2}, 2, \pi, 6 \right\}.$$

Natural numbers - $\{2, 6\}$

Integers - $\{-6, 0, 2, 6\}$

Rational numbers - $\left\{ -6, -\frac{4}{3}, 0, \frac{5}{8}, 2, 6 \right\}$

Irrational numbers - $\{-\sqrt{6}, \sqrt{2}, \pi\}$

$$\mathbf{1.1.3:} - \left\{ -4.2, \sqrt{4}, -\frac{1}{9}, 0, \frac{3}{11}, \sqrt{11}, 5.\bar{5}, 5.543 \right\}.$$

Natural numbers - $\{\sqrt{4}\}$

Integers - $\{\sqrt{4}, 0\}$

Rational numbers - $\left\{ -4.2, -\frac{1}{9}, 0, \frac{3}{11}, 5.\bar{5}, 5.543 \right\}$

Irrational numbers - $\{\sqrt{11}\}$

For the next two problems use an overbar symbol to rewrite the decimal using the smallest number of digits possible.

$$\mathbf{1.1.7:} - 2.121212 \dots$$

$$2.\overline{12}$$

Date: Due Friday, September 4th.

1.1.8: - $0.436436436\dots$

$$0.\overline{436}$$

1.1.11: - List all odd integers between π and 10.

$$5, 7, 9$$

1.1.13: Plot the real numbers in the set $\{3, \frac{5}{2}, -\frac{7}{2}, -5.2\}$ on the real number line.

In the following exercises, place the correct inequality symbol between the pair of numbers.

1.1.19: $\frac{4}{5} < 1$

1.1.22: $9 > -1$

1.1.23: $-5 < -2$

1.1.26: $\frac{3}{2} < \frac{5}{2}$

In the following exercises, find the distance between the pair of real numbers.

1.1.29: 4 and 10

$$6$$

1.1.32: -54 and 32

86

1.1.33: 18 and -32

50

1.1.36: 0 and 125

125

1.1.39: -6 and -9

3

1.1.40: -12 and -7

5

In the following exercises, evaluate the given expression.

1.1.42: $|62|$

62

1.1.43: $|-225|$

225

1.1.48: $-|-25|$ -25 **1.1.51:** $-|3.5|$ -3.5 **1.1.53:** $|- \pi|$ π **1.1.54:** $-|\pi|$ $-\pi$

In the following exercises, place the correct symbol ($<$, $>$, or $=$) between the pair of real numbers.

1.1.55: $|-6| > |2|$

1.1.58: $|150| < |-310|$

1.1.59: $|-1.8| = |1.8|$

1.1.62: $-|-\frac{7}{3}| < -|\frac{1}{3}|$

In the following exercises, write the statement using inequality notation.

1.1.83: x is negative.

$$x < 0$$

1.1.85: u is at least 16.

$$u \geq 16$$

1.1.91: Find the two possible values of a given $|a| = 4$.

$$a = \pm 4$$

2. SECTION 1.2 - OPERATIONS WITH REAL NUMBERS

Evaluate the expressions.

1.2.1: $13 + 32$

$$45$$

1.2.2: $16 + 84$

$$100$$

1.2.4: $-5 + 9$

$$4$$

1.2.6: $-5.1 + 0.9$

$$-4.2$$

1.2.9: $12.6 + (-38.5)$

$$-25.9$$

1.2.12: $-3 - 17$

$$-20$$

1.2.15: $4 - (-11) + 9$

$$24$$

1.2.17: $5.3 - 2.2 - 6.9$

$$-3.8$$

1.2.20: $6 + 26 - 17 + (-10)$

$$5$$

1.2.23: $\frac{3}{4} - \frac{1}{4}$

$$\frac{1}{2}$$

1.2.26: $\frac{6}{7} + \left(-\frac{3}{7}\right)$

$$\frac{3}{7}$$

1.2.31: $10\frac{5}{8} - 6\frac{1}{4}$

$$\frac{35}{8}$$

1.2.35: $-(-11.325) + |34.625|$

$$45.95$$

1.2.37: $-|-6\frac{7}{8}| - 8\frac{1}{4}$

$$-\frac{121}{8}$$

1.2.42: Write the expression $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$ as a multiplication problem.

$$4 \times \frac{2}{3}$$

In the following exercises find the requested product.

1.2.45: $5(-6)$

$$-30$$

1.2.48: $(-4)(-7)$

$$28$$

1.2.51: $(-1)(12)(-3)$

$$36$$

1.2.54: $\left(-\frac{4}{7}\right)\left(-\frac{4}{5}\right)$

$$\frac{16}{35}$$

$$\mathbf{1.2.55:} \quad -\frac{3}{2} \left(\frac{8}{5} \right)$$

$$-\frac{12}{5}$$

$$\mathbf{1.2.58:} \quad \frac{1}{3} \left(\frac{2}{3} \right)$$

$$\frac{2}{9}$$

$$\mathbf{1.2.61:} \quad \frac{1}{3} \left(-\frac{3}{4} \right) (2)$$

$$-\frac{1}{2}$$

In the following exercises, find the reciprocal

$$\mathbf{1.2.63:} \quad 6$$

$$\frac{1}{6}$$

$$\mathbf{1.2.66:} \quad \frac{9}{5}$$

$$\frac{5}{9}$$

$$\mathbf{1.2.68:} \quad -\frac{2}{13}$$

$$-\frac{13}{2}$$

In the following exercises, evaluate the given expression.

$$\mathbf{1.2.70:} \quad -\frac{30}{-15}$$

$$2$$

$$\mathbf{1.2.71:} \quad -48 \div 16$$

$$-3$$

$$\begin{aligned} \mathbf{1.2.76:} & -\frac{11}{12} \div \frac{5}{24} \\ & -\frac{22}{5} \end{aligned}$$

$$\begin{aligned} \mathbf{1.2.79:} & -4\frac{1}{4} \div -5\frac{5}{8} \\ & \frac{34}{45} \end{aligned}$$

$$\begin{aligned} \mathbf{1.2.81:} & 4\frac{1}{8} \div 4\frac{1}{2} \\ & \frac{11}{12} \end{aligned}$$

1.2.87: Write the expression $-(7 \cdot 7 \cdot 7)$ using exponential notation.

$$-(7^3)$$

In the following problems evaluate the given exponential expression.

$$\begin{aligned} \mathbf{1.2.91:} & (-2)^4 \\ & 16 \end{aligned}$$

$$\begin{aligned} \mathbf{1.2.96:} & \left(\frac{2}{3}\right)^4 \\ & \frac{16}{81} \end{aligned}$$

In the following exercises, evaluate the given expression.

$$\begin{aligned} \mathbf{1.2.105:} & 24 - 5 \cdot 2^2 \\ & 4 \end{aligned}$$

$$\begin{aligned} \mathbf{1.2.109:} & 14 - 2(8 - 4) \\ & 6 \end{aligned}$$

$$\begin{aligned} \mathbf{1.2.112:} & 72 - 8(6^2 \div 9) \\ & 40 \end{aligned}$$

1.2.115: $5^3 + |-14 + 4|$

135

1.2.119: $\frac{4^2 - 5}{11} - 7$

-6

1.2.121: $\frac{6 \cdot 2^2 - 12}{3^2 + 3}$

1

1.2.122: $\frac{7^2 - 2(11)}{5^2 + 8(-2)}$

3

1.2.134: *Profit* The midyear financial statement of a clothing company showed a profit of \$1,345,298.55. At the close of the year, the financial statement showed a profit for the year of \$867,132.87. Find the profit (or loss) of the company for the second 6 months of the year.

-\$478,165.68

1.2.138: (a): You save \$60 per month for 30 years. How much money has been set aside during the 30 years?

$\$60 \times 12 \times 30 = \$21,600$

(b): If the money in part (a) is deposited in a savings account earning 3% interest compounded monthly, the total amount in the account after 30 years will be:

$$60 \left[\left(1 + \frac{0.03}{12} \right)^{360} - 1 \right] \left(1 + \frac{12}{0.03} \right).$$

Use a calculator to determine this amount.

\$35,051.62

(c): How much of the amount in part (b) is earnings from interest?

\$13.451.62

3. SECTION 1.3 - PROPERTIES OF REAL NUMBERS

In the following exercises identify the property of real numbers illustrated by the statement.

1.3.1: $18 - 18 = 0$

Additive Inverse Property

1.3.5: $13 + 12 = 12 + 13$

Commutative Property of Addition

1.3.12: $1 \cdot 9k = 9k$

Multiplicative Identity Property

In the following exercises complete the statement using the specified property of real numbers.

1.3.21: Commutative Property of Multiplication: $15(-3) = (-3)15$

1.3.24: Distributive Property: $(8 - y)(4) = 8 \cdot 4 - y \cdot 4$

In the following exercises give (a) the additive inverse and (b) the multiplicative inverse of the quantity.

1.3.33: $\frac{1}{2}$

Additive Inverse = $-\frac{1}{2}$
 Multiplicative Inverse = 2

1.3.37: $6z, z \neq 0$

Additive Inverse = $-6z$
 Multiplicative Inverse = $\frac{1}{6z}$

1.3.40: $y - 7, y \neq 7$.

Additive Inverse = $-(y - 7) = 7 - y$
 Multiplicative Inverse = $\frac{1}{y - 7}$

In the following exercises rewrite the expression using the Distributive Property.

1.3.45: $20(2 + 5)$

$$20 \cdot 2 + 20 \cdot 5$$

1.3.49: $-6(2y - 5)$

$$-6(2y) + (-6)(-5) = -12y + 30$$

1.3.50: $-4(10 - b)$

$$-4 \cdot 10 + (-4)(-b) = -40 + 4b$$

1.3.65: Identify the property of real numbers that justifies each step.

$2x - 5 = 6$	Original Equation
$(2x - 5) + 5 = 6 + 5$	Addition Property of Equality
$2x + (-5 + 5) = 11$	Associative Property of Addition
$2x + 0 = 11$	Additive Inverse Property
$2x = 11$	Additive Identity Property
$\frac{1}{2}(2x) = \frac{1}{2}(11)$	Multiplication Property of Equality
$\left(\frac{1}{2} \cdot 2\right)x = \frac{11}{2}$	Associative Property of Multiplication
$1 \cdot x = \frac{11}{2}$	Multiplicative Inverse Property
$x = \frac{11}{2}$	Multiplicative Identity Property