Chapter 3 Practice Test: Rational Numbers

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. Order the numbers from least to greatest.
   \[-0.3, -0.\overline{3}, -0.33\]
   a. \[-0.3, -3\overline{3}, -0.3\] c. \[-0.33, -0.\overline{3}, -0.3\]
   b. \[-0.3, -0.\overline{3}, -0.33\] d. \[-0.3, -0.33, -0.3\]

_____ 2. Which numbers below would make this sentence true?
   \[-5.6 + \Box \leq -1.5\]
   i) 4.1
   ii) 5.1
   iii) 3.7
   iv) 4.6
   a. i and iii b. ii and iv c. i and iv d. ii and iii

_____ 3. Which expression has the least sum?
   i) \[9.54 + 6.32\]
   ii) \[-9.54 + 6.32\]
   iii) \[9.54 + (-6.32)\]
   iv) \[-9.54 + (-6.32)\]
   a. i b. ii c. iv d. iii

_____ 4. Which expressions have the same answer as \[-3\frac{2}{3} - (-11)\]?
   i) \[11 + 3\frac{2}{3}\]
   ii) \[-11 + 3\frac{2}{3}\]
   iii) \[-3\frac{2}{3} + 11\]
   iv) \[11 - 3\frac{2}{3}\]
   a. i and ii b. iii and iv c. ii and iv d. i and iii

_____ 5. The temperature at the top of a mountain is 10.8°C less than the temperature at the base of the mountain. If the temperature at the base is \[-4.4°C\], what is the temperature at the top?
   a. 6.4°C b. 15.2°C c. -15.2°C d. -6.4°C

_____ 6. The price of a share changed by \[-$1.85\]. A person owns 120 shares. By how much did his shares change in value?
   a. +$222.00 b. -$102.00 c. -$222.00 d. -$64.86
7. Which quotients are less than $-1$?
   
i) $\left( \frac{1}{8} \right) + \frac{1}{7}$
   
ii) $\left( \frac{1}{7} \right) + \frac{1}{8}$
   
iii) $\frac{1}{8} + \left( \frac{1}{7} \right)$
   
iv) $\frac{1}{7} + \left( \frac{1}{8} \right)$
   
a. i and iii  
b. ii and iv  
c. iii and iv  
d. i and ii

8. Which operation would you do first to evaluate this expression?
   
   $8.8 - 1.4 \div 0.2 \times 2.1 + 3.5$
   
a. Add 3.5 to 2.1.  
b. Multiply 0.2 by 2.1.  
c. Subtract 1.4 from 8.8.  
d. Divide 1.4 by 0.2.

9. Which expression has the greatest value?
   
i) $9.1 - 2.7 \times (-1.8)^2$
   
ii) $9.1 - [2.7 \times (-1.8)^2]$
   
iii) $(9.1 - 2.7) \times (-1.8)^2$
   
iv) $9.1 \times (-2.7) \times (-1.8)^2$
   
a. iv  
b. iii  
c. ii  
d. i

Short Answer

10. Determine this sum.
   
   $4 \frac{1}{8} + \left( -2 \frac{2}{3} \right)$

11. Determine a rational number that makes this statement true.
   
   $\square - 12.8 \leq -8.2$

12. Determine this product.
   
   $(-5.2)(-15.2)(-18.5)$

13. a) Write a division expression with the same answer as $\frac{5}{2} + \left( -\frac{5}{2} \right)$.
   
   b) Write two multiplication expressions with the same answer as $\frac{5}{2} + \left( -\frac{5}{2} \right)$.
14. Evaluate.
\[
\left\{ \frac{2}{3} + \frac{1}{5} \right\} + \left\{ \left( \frac{-9}{14} \right) \times \frac{7}{15} \right\}
\]

Problem

15. Use the numbers in the box below.
   a) List the numbers that are greater than $-1.6$.
   b) List the numbers that are less than 2.3.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$-\frac{11}{7}$</td>
<td>-0.9</td>
<td>$2\frac{1}{4}$</td>
<td>$2\frac{1}{2}$</td>
</tr>
<tr>
<td>$\frac{10}{3}$</td>
<td>$-1\frac{5}{8}$</td>
<td>$\frac{12}{7}$</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>2.45</td>
<td></td>
<td>-1.8</td>
</tr>
</tbody>
</table>

16. a) Predict the sign of $(-3.5)(2.5)(-4.4)$. Explain your reasoning.
   b) Calculate the product. Show your work.

17. At a desert resort, the temperature at 7 a.m. was 3°C.
    The temperature increased by an average of 3.4°C each hour until it reached 30.2°C.
    How long did it take to reach this temperature?

18. The formula for the surface area of a right rectangular prism is given by $A = 2(ab + bc + ac)$, where $a$ is its length, $b$ is its width, and $c$ is its height.
    Determine the surface area of this prism.
Chapter 3 Practice Test: Rational Numbers
Answer Section

MULTIPLE CHOICE

1. **ANS:** D  
   **PTS:** 1  
   **DIF:** Moderate  
   **REF:** 3.1 What Is a Rational Number?  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Conceptual Understanding | Procedural Knowledge

2. **ANS:** A  
   **PTS:** 1  
   **DIF:** Difficult  
   **REF:** 3.2 Adding Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Procedural Knowledge

3. **ANS:** C  
   **PTS:** 1  
   **DIF:** Moderate  
   **REF:** 3.2 Adding Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Conceptual Understanding

4. **ANS:** B  
   **PTS:** 1  
   **DIF:** Easy  
   **REF:** 3.3 Subtracting Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Conceptual Understanding

5. **ANS:** C  
   **PTS:** 1  
   **DIF:** Moderate  
   **REF:** 3.3 Subtracting Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Procedural Knowledge | Problem-Solving Skills

6. **ANS:** C  
   **PTS:** 1  
   **DIF:** Moderate  
   **REF:** 3.4 Multiplying Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Problem-Solving Skills

7. **ANS:** B  
   **PTS:** 1  
   **DIF:** Difficult  
   **REF:** 3.5 Dividing Rational Numbers  
   **LOC:** 9.N3  
   **TOP:** Number  
   **KEY:** Conceptual Understanding

8. **ANS:** D  
   **PTS:** 1  
   **DIF:** Easy  
   **REF:** 3.6 Order of Operations with Rational Numbers  
   **LOC:** 9.N4  
   **TOP:** Number  
   **KEY:** Conceptual Understanding

9. **ANS:** B  
   **PTS:** 1  
   **DIF:** Moderate  
   **REF:** 3.6 Order of Operations with Rational Numbers  
   **LOC:** 9.N4  
   **TOP:** Number  
   **KEY:** Procedural Knowledge

SHORT ANSWER

10. **ANS:**  
    11  
    24  
    **PTS:** 1  
    **DIF:** Moderate  
    **REF:** 3.2 Adding Rational Numbers  
    **LOC:** 9.N3  
    **TOP:** Number  
    **KEY:** Procedural Knowledge

11. **ANS:**  
    Any rational number less than or equal to 4.6.  
    **PTS:** 1  
    **DIF:** Difficult  
    **REF:** 3.3 Subtracting Rational Numbers  
    **LOC:** 9.N3  
    **TOP:** Number  
    **KEY:** Procedural Knowledge | Problem-Solving Skills

12. **ANS:**  
    −1462.24  
    **PTS:** 1  
    **DIF:** Difficult  
    **REF:** 3.4 Multiplying Rational Numbers  
    **LOC:** 9.N3  
    **TOP:** Number  
    **KEY:** Procedural Knowledge
13. **ANS:**
   Answers may vary. For example:
   a) \[ \left( -\frac{5}{2} \right) + \frac{5}{2} \]
   b) \[ \frac{5}{2} \times \left( -\frac{2}{5} \right) \times \left( -\frac{5}{2} \right) \times \frac{2}{5} \]

   **PTS:** 1  **DIF:** Moderate  **REF:** 3.5 Dividing Rational Numbers
   **LOC:** 9.N3  **TOP:** Number  **KEY:** Problem-Solving Skills

14. **ANS:**
   \[ -\frac{26}{9}, \text{ or } -\frac{8}{9} \]

   **PTS:** 1  **DIF:** Moderate  **REF:** 3.6 Order of Operations with Rational Numbers
   **LOC:** 9.N4  **TOP:** Number  **KEY:** Procedural Knowledge

**PROBLEM**

15. **ANS:**
   a) \(-\frac{11}{7}, -0.9, 1.3, \frac{12}{7}, \frac{1}{2}, 2, \frac{1}{2}, 2.45, \frac{10}{3}\)
   b) \(-1.8, -\frac{5}{8}, -\frac{11}{7}, -0.9, 1.3, \frac{12}{7}, \frac{1}{2}\)

   **PTS:** 1  **DIF:** Moderate  **REF:** 3.1 What Is a Rational Number?
   **LOC:** 9.N3  **TOP:** Number  **KEY:** Problem-Solving Skills

16. **ANS:**
   a) \((-3.5)(2.5)\) is negative since the factors have opposite signs.
      So, \((-3.5)(2.5)(-4.4) = \left[ (-3.5)(2.5) \right](-4.4)\) is positive since \((-3.5)(2.5)\) and \(-4.4\) are both negative.
   b) \((-3.5)(2.5)(-4.4) = \left[ (-3.5)(2.5) \right](-4.4)\)
      \[ = (-8.75)(-4.4) \]
      \[ = 38.5 \]

   **PTS:** 1  **DIF:** Difficult  **REF:** 3.4 Multiplying Rational Numbers
   **LOC:** 9.N3  **TOP:** Number  **KEY:** Procedural Knowledge | Communication
17. ANS:
  Temperature change:
  \[30.2^\circ C - 3^\circ C = 27.2^\circ C\]
  Number of hours the temperature increased:
  \[27.2^\circ C ÷ 3.4^\circ C/h = 8\; h\]
  So, it took 8 h to reach 30.2°C.

PTS:  1     DIF:  Moderate     REF:  3.5 Dividing Rational Numbers
LOC:  9.N3   TOP:  Number     KEY:  Problem-Solving Skills

18. ANS:
  The surface area of the prism is 229.72 cm².

PTS:  1     DIF:  Moderate     REF:  3.6 Order of Operations with Rational Numbers
LOC:  9.N4   TOP:  Number     KEY:  Problem-Solving Skills