

Master 3.16a

Unit Test: Unit 3 Rational Numbers

Do not use a calculator for questions 1 to 8.

1. Which of the following rational numbers are equal to $-\frac{5}{4}$?

$$\frac{-5}{4}, \frac{-5}{-4}, \frac{10}{8}, \frac{5}{-4}$$

2. Sketch a number line and mark each rational number on it. Order the numbers from greatest to least.

$$-3.1, \frac{5}{3}, -1.2, -\frac{1}{7}, 0.6$$

3. In each pair, which number is greater? Explain your answer.

a) $-\frac{6}{5}, -\frac{5}{6}$

b) $-\overline{3.32}, -3.32$

4. Determine each sum or difference.

a) $-\frac{3}{5} + \left(-\frac{2}{3}\right)$

b) $2\frac{3}{8} - \left(-1\frac{1}{4}\right)$

c) $-4.1 - 3.5$

d) $-53.9 - (-19.4)$

5. Predict which expression has the greater value. Explain your reasoning. Evaluate the expressions to check your prediction.

$$\frac{3}{4} \times \left(-\frac{1}{2}\right)$$

$$\frac{3}{4} \div \left(-\frac{1}{2}\right)$$

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Unit Test continued

6. Evaluate.

a) $-\frac{1}{4} \times \left(-\frac{3}{5}\right)$

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

c) $(-0.32) \div 1.6$

7. These are the second, third, and fourth terms in a pattern: 3, -2 , $\frac{4}{3}$ Each term can be found by dividing the previous term by $-\frac{3}{2}$.

a) Determine the next two terms in the pattern.

b) What is the first term in the pattern? Explain how you determined it.

8. Evaluate.

a) $0.84 \times (-0.5) - (-2.3)$

b) $\left(-\frac{1}{2}\right) + \frac{3}{5} + \left[\frac{9}{10} - \left(-\frac{3}{5}\right)\right]$

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Unit Test continued

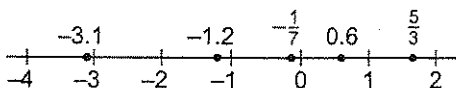
9. The following temperatures were recorded at the Port Hardy, B.C. airport at noon in one week:
 -2.3°C , -4.2°C , -1.4°C , 0.5°C , 1.3°C , -0.7°C , -3.8°C
- a) What was the mean temperature at noon that week to the nearest tenth of a degree?
- b) The mean temperature for that month was -6.8°C .
Is the mean temperature for the week in part a greater than or less than the mean monthly temperature?
By how much is the mean temperature for the week greater than or less than the mean monthly temperature?
10. Evaluate. Round the answer to the nearest hundredth if necessary. Explain how you used the order of operations in each part.
- a) $-5\frac{2}{5} \div \left[\left(-\frac{1}{8} \right) + 4\frac{1}{2} \right] + \left(-2\frac{2}{7} \right)$
- b)
$$\frac{-8.6 \times 14.6 - 5.3 \div [(-19.4) - 8.6]}{(-2.9) \times 6.3 - (-9.5)}$$

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Unit 3 Test Sample Answers

1. $\frac{-5}{4}, \frac{5}{-4}$

2. $\frac{5}{3}, 0.6, -\frac{1}{7}, -1.2, -3.1$



3. a) $-\frac{5}{6}$ is greater because $-\frac{6}{5}$ is less than -1 and $-\frac{5}{6}$ is greater than -1 .

b) -3.32 is greater because it is to the right of $-3.\overline{32}$ on a number line.

4. a) $-\frac{3}{5} + \left(-\frac{2}{3}\right) = -\frac{9}{15} + \left(-\frac{10}{15}\right) = -\frac{19}{15} = -1\frac{4}{15}$

b) $2\frac{3}{8} - \left(-1\frac{1}{4}\right) = \frac{19}{8} - \left(-\frac{5}{4}\right) = \frac{19}{8} - \left(-\frac{10}{8}\right)$
 $= \frac{19}{8} + \frac{10}{8} = \frac{29}{8} = 3\frac{5}{8}$

c) $-4.1 - 3.5 = -7.6$

d) $-53.9 - (-19.4) = -53.9 + 19.4 = -34.5$

5. Both answers are negative. $\frac{3}{4} \times \left(-\frac{1}{2}\right)$ is greater because it is closer to 0 than

$$\frac{3}{4} + \left(-\frac{1}{2}\right) = \frac{3}{4} \times (-2)$$

Check: $\frac{3}{4} \times \left(-\frac{1}{2}\right) = -\frac{3}{8}$

$$\frac{3}{4} + \left(-\frac{1}{2}\right) = \frac{3}{4} \times (-2) = -\frac{6}{4} = -\frac{3}{2}$$

6. a) $-\frac{1}{4} \times \left(-\frac{3}{5}\right) = \frac{3}{20}$

b) $\frac{5}{6} + \left(-\frac{2}{3}\right) = \frac{5}{6} + \left(-\frac{4}{6}\right) = -\frac{5}{6} = -1\frac{1}{4}$

c) $(-0.32) \div 1.6 = -0.2$

7. a) $-\frac{8}{9}, \frac{16}{27}$

b) Let \square represent the first term.

$$\square + \left(-\frac{3}{2}\right) = 3$$

I know that to determine the first term I can use the related multiplication statement.

$$\square = \left(-\frac{3}{2}\right) \times 3$$

$$\square = -\frac{9}{2} \text{ The first term is } -\frac{9}{2}.$$

8. a) $0.84 \times (-0.5) - (-2.3) = -0.42 - (-2.3)$
 $= 1.88$

b) $\left(-\frac{1}{2}\right) + \frac{3}{5} + \left[\frac{9}{10} - \left(-\frac{3}{5}\right)\right] = \left(-\frac{1}{2}\right) + \frac{3}{5} + \left[\frac{9}{10} - \left(-\frac{6}{10}\right)\right]$
 $= \left(-\frac{1}{2}\right) + \frac{3}{5} + \frac{15}{10} = \left(-\frac{1}{2}\right) + \frac{6}{10} + \frac{15}{10}$
 $= \left(-\frac{1}{2}\right) + \frac{6}{15} = \left(-\frac{1}{2}\right) + \frac{2}{5} = -\frac{5}{10} + \frac{4}{10} = -\frac{1}{10}$

9. a) $-2.3 + (-4.2) + (-1.4) + 0.5 + 1.3 + (-0.7)$
 $(-3.8) \div 7 \approx -1.5$
The mean temperature for the week was approximately -1.5°C .

b) Greater: $-1.5 > -6.8$
 $-1.5 - (-6.8) = 5.3$
The mean for the week is greater by 5.3°C .

10. a) Add the numbers in the brackets, then divide, and finally add.

$$-5\frac{2}{5} + \left[\left(-\frac{1}{8}\right) + 4\frac{1}{2}\right] + \left(-2\frac{2}{7}\right) = -3\frac{13}{25}$$

b) Simplify the numerator by subtracting the numbers in the brackets, multiplying and dividing, and then subtracting. Simplify the denominator by multiplying, then subtracting. Finally, divide the numerator by the denominator.

$$\frac{-8.6 \times 14.6 - 5.3 + [(-19.4) - 8.6]}{(-2.9) \times 6.3 - (-9.5)} \approx 14.30$$