

# Comparing and Ordering Rational Numbers

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Q Quick Review

To compare two rational numbers, picture the **number line**: the number farther to the *right* is always **greater**. This means every positive number is greater than every negative number, and 0 sits in between. With two negatives, the one *closer to zero* is greater — so  $-3 > -7$ . To compare fractions or decimals, rewrite them in the same form (a common denominator, or all decimals) so the comparison is easy. Use  $<$  for “less than,”  $>$  for “greater than,” and  $=$  for “equal to.”

◇ **Example:** Compare  $-\frac{3}{4}$  and  $-\frac{1}{2}$  using  $<$  or  $>$ .

⇒ Both numbers are negative, so think about the number line. Let us give them a common denominator of 4:  $-\frac{1}{2} = -\frac{2}{4}$ , while  $-\frac{3}{4}$  stays the same. Now compare  $-\frac{3}{4}$  and  $-\frac{2}{4}$ . On the number line,  $-\frac{3}{4}$  is farther left (farther from zero), so it is the smaller number. That means  $-\frac{3}{4} < -\frac{1}{2}$ .

**Answer:**  $-\frac{3}{4} < -\frac{1}{2}$

## PRACTICE

Compare each pair using  $<$ ,  $>$ , or  $=$ .

- |   |       |  |       |
|---|-------|--|-------|
| 1. $5 \square 9$                        | _____ | 11. $0.5 \square 0.45$                 | _____ |
| 2. $-3 \square 2$                       | _____ | 12. $-0.5 \square -0.05$               | _____ |
| 3. $-3 \square -7$                      | _____ | 13. $\frac{3}{5} \square 0.6$          | _____ |
| 4. $-10 \square -4$                     | _____ | 14. $\frac{2}{3} \square 0.7$          | _____ |
| 5. $0 \square -6$                       | _____ | 15. $-2 \square -2$                    | _____ |
| 6. $-8 \square 0$                       | _____ | 16. $-\frac{7}{2} \square -3$          | _____ |
| 7. $\frac{1}{2} \square \frac{3}{4}$    | _____ | 17. $\frac{9}{4} \square 2$            | _____ |
| 8. $\frac{2}{3} \square \frac{1}{2}$    | _____ | 18. $-1.25 \square -1.5$               | _____ |
| 9. $-\frac{1}{2} \square -\frac{3}{4}$  | _____ | 19. Order 3, -2, 0 least to greatest   | _____ |
| 10. $-\frac{2}{3} \square -\frac{5}{6}$ | _____ | 20. Order -1, -5, -3 least to greatest | _____ |

## ◆ Word Problems

21. On Monday the low temperature was  $-3^\circ\text{F}$  and on Tuesday it was  $-8^\circ\text{F}$ . Which day was colder? \_\_\_\_\_
22. Three divers are at depths  $-12$  m,  $-7$  m, and  $-15$  m. Order their depths from highest (closest to the surface) to lowest. \_\_\_\_\_
23. Two runners finished a race  $\frac{2}{3}$  second and  $\frac{3}{5}$  second behind the winner. Who finished closer to the winner? \_\_\_\_\_
24. Bank balances are  $\$-15$ ,  $\$5$ , and  $\$-20$ . Order them from least to greatest. \_\_\_\_\_



## Answer Keys

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. <math>5 &lt; 9</math></li> <li>2. <math>-3 &lt; 2</math></li> <li>3. <math>-3 &gt; -7</math></li> <li>4. <math>-10 &lt; -4</math></li> <li>5. <math>0 &gt; -6</math></li> <li>6. <math>-8 &lt; 0</math></li> <li>7. <math>\frac{1}{2} &lt; \frac{3}{4}</math></li> <li>8. <math>\frac{2}{3} &gt; \frac{1}{2}</math></li> <li>9. <math>-\frac{1}{2} &gt; -\frac{3}{4}</math></li> <li>10. <math>-\frac{2}{3} &gt; -\frac{5}{6}</math></li> <li>11. <math>0.5 &gt; 0.45</math></li> <li>12. <math>-0.5 &lt; -0.05</math></li> </ol> | <ol style="list-style-type: none"> <li>13. <math>\frac{3}{5} = 0.6</math></li> <li>14. <math>\frac{2}{3} &lt; 0.7</math></li> <li>15. <math>-2 = -2</math></li> <li>16. <math>-\frac{7}{2} &lt; -3</math></li> <li>17. <math>\frac{9}{4} &gt; 2</math></li> <li>18. <math>-1.25 &gt; -1.5</math></li> <li>19. <math>-2, 0, 3</math></li> <li>20. <math>-5, -3, -1</math></li> <li>21. Tuesday</li> <li>22. <math>-7, -12, -15</math></li> <li>23. the <math>\frac{3}{5}</math>-second runner</li> <li>24. <math>-20, -15, 5</math></li> </ol> |
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### Step-by-Step Explanations

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|--|---|
| <ol style="list-style-type: none"> <li>1. 9 is farther right on the number line, so <math>5 &lt; 9</math>.</li> <li>2. Every negative number is less than every positive, so <math>-3 &lt; 2</math>.</li> <li>3. With two negatives, the one closer to zero is greater: <math>-3 &gt; -7</math>.</li> <li>4. <math>-10</math> is farther from zero, so it is less: <math>-10 &lt; -4</math>.</li> <li>5. Zero is greater than every negative number, so <math>0 &gt; -6</math>.</li> <li>6. Every negative number is less than zero, so <math>-8 &lt; 0</math>.</li> <li>7. Common denominator: <math>\frac{2}{4} &lt; \frac{3}{4}</math>.</li> <li>8. Common denominator 6: <math>\frac{4}{6} &gt; \frac{3}{6}</math>.</li> <li>9. <math>-\frac{2}{4} &gt; -\frac{3}{4}</math> since <math>-\frac{1}{2}</math> is closer to zero.</li> <li>10. <math>-\frac{4}{6} &gt; -\frac{5}{6}</math>, so <math>-\frac{2}{3}</math> is greater.</li> <li>11. <math>0.50 &gt; 0.45</math> when you compare place by place.</li> <li>12. <math>-0.5</math> is farther from zero than <math>-0.05</math>, so it is less.</li> <li>13. <math>\frac{3}{5} = 0.6</math> exactly, so they are equal.</li> <li>14. <math>\frac{2}{3} \approx 0.667</math>, which is less than <math>0.7</math>.</li> </ol> | <ol style="list-style-type: none"> <li>15. The same number is equal to itself: <math>-2 = -2</math>.</li> <li>16. <math>-\frac{7}{2} = -3.5</math>, which is less than <math>-3</math>.</li> <li>17. <math>\frac{9}{4} = 2.25</math>, which is greater than <math>2</math>.</li> <li>18. <math>-1.25</math> is closer to zero than <math>-1.5</math>, so it is greater.</li> <li>19. From left to right on the number line: <math>-2</math>, then <math>0</math>, then <math>3</math>.</li> <li>20. The most negative comes first: <math>-5</math>, then <math>-3</math>, then <math>-1</math>.</li> <li>21. <math>-8 &lt; -3</math> because <math>-8</math> is farther from zero on the number line, so Tuesday was colder.</li> <li>22. Closest to the surface means closest to zero: <math>-7</math> is highest, then <math>-12</math>, then <math>-15</math> is deepest.</li> <li>23. Common denominator 15: <math>\frac{2}{3} = \frac{10}{15}</math> and <math>\frac{3}{5} = \frac{9}{15}</math>. Since <math>\frac{9}{15} &lt; \frac{10}{15}</math>, the <math>\frac{3}{5}</math>-second runner was closer.</li> <li>24. <math>-20</math> is the most negative, then <math>-15</math>, and <math>5</math> is the only positive, so it is greatest.</li> </ol> |
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