

Name Key  
Mrs. Roumbos

Date \_\_\_\_\_  
8R Period \_\_\_\_\_

## Comparing and Ordering Rational and Irrational Numbers

### Comparing Rational and Irrational Numbers

To compare rational and irrational number, convert them to the same form. Use decimal approximations (nearest hundredth) for irrational numbers. When the numbers are in decimal form, compare the digits from greatest place to least place. Then use  $<$ ,  $>$ , or  $=$  to compare the numbers.

➤ Example: Compare  $2\frac{4}{5}$  and 2.67

1. Convert  $2\frac{4}{5}$  to a decimal.

○  $2\frac{4}{5} = 2.8$

2. Use  $<$ ,  $>$  or  $=$  to compare the decimals.

○  $2.80 > 2.67$

Therefore,  $2\frac{4}{5} > 2.67$

➤ Example: Compare 3.1 and  $\pi$

1. Use a decimal approximation for  $\pi$ .

○  $\pi \approx 3.14$

2. Use  $<$ ,  $>$  or  $=$  to compare the decimals.

○  $3.10 < 3.14$

Therefore,  $3.1 < \pi$

➤ Example: Compare  $\pi$  and  $\sqrt{10}$

1. Use approximations for  $\pi$  and  $\sqrt{10}$ .

○  $\pi \approx 3.14$  and  $\sqrt{10} \approx 3.16$

2. Use  $<$ ,  $>$  or  $=$  to compare the decimals.

○  $3.14 < 3.16$

Therefore,  $\pi < \sqrt{10}$

$<$  : less than

$>$  : greater than

$=$  : equal to

**Practice**

Directions: For questions 1 through 10, compare the two numbers using  $<$ ,  $>$ , or  $=$ . Round your work to the nearest hundredth.

*make sure to write the original form of the #*

<p>1) <math>\frac{3}{4}</math> and 0.7</p> <p><math>0.75 &gt; 0.70</math></p> <p><math>\frac{3}{4} &gt; .7</math></p> <hr/>	<p>6) <math>\sqrt{15}</math> and <math>\sqrt{22}</math></p> <p><math>3.87 &lt; 4.69</math></p> <p><math>\sqrt{15} &lt; \sqrt{22}</math></p> <hr/>
<p>2) <math>\pi</math> and 4</p> <p><math>3.14 &lt; 4.00</math></p> <p><math>\pi &lt; 4</math></p> <hr/>	<p>7) <math>-\sqrt{8}</math> and <math>-\pi</math></p> <p><math>-2.83 &gt; -3.14</math></p> <p><math>-\sqrt{8} &gt; -\pi</math></p> <hr/>
<p>3) <math>\sqrt{2}</math> and 1.44</p> <p><math>1.41 &lt; 1.44</math></p> <p><math>\sqrt{2} &lt; 1.44</math></p> <hr/>	<p>8) <math>\frac{8}{3}</math> and <math>\sqrt{2}</math></p> <p><math>2.67 &gt; 1.41</math></p> <p><math>\frac{8}{3} &gt; \sqrt{2}</math></p> <hr/>
<p>4) -3 and <math>-\sqrt{7}</math></p> <p><math>-3.00 &lt; -2.65</math></p> <p><math>-3 &lt; -\sqrt{7}</math></p> <hr/>	<p>9) <math>\frac{2}{9}</math> and <math>\frac{3}{11}</math></p> <p><math>.22 &lt; .27</math></p> <p><math>\frac{2}{9} &lt; \frac{3}{11}</math></p> <hr/>
<p>5) 7.2 and <math>7\frac{2}{3}</math></p> <p><math>7.20 &lt; 7.67</math></p> <p><math>7.2 &lt; 7\frac{2}{3}</math></p> <hr/>	<p>10) 3 and <math>\sqrt{9}</math></p> <p><math>3.00 = 3.00</math></p> <p><math>3 = \sqrt{9}</math></p> <hr/>

Extra: 1)  $\sqrt{6} + 5$   $<$   $6 + \sqrt{5}$

$2.45 + 5.00$        $6.00 + 2.24$

$7.45 < 8.24$

2)  $\sqrt{15} - 3$   $>$   $-2 + \sqrt{5}$

$3.87 - 3.00$        $-2.00 + 2.24$

$.87 > .24$

## Ordering Rational and Irrational Numbers

You can use a number line to order rational and irrational numbers. Once all the numbers have been plotted on the number line, they will be in order from least to greatest, from left to right.

- Example: Plot the following numbers on a number line. Then, list them in order from least to greatest.

$$\sqrt{6} \quad \pi \quad \frac{15}{4} \quad \sqrt{8} \quad \sqrt{3}$$

First find decimal approximations for each number.

$$\sqrt{6} \approx 2.45$$

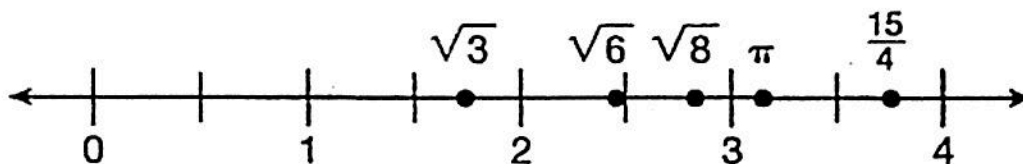
$$\pi \approx 3.14$$

$$\frac{15}{4} = 3.75$$

$$\sqrt{8} \approx 2.83$$

$$\sqrt{3} \approx 1.73$$

Now plot each of these decimals on the number line.



In order from least to greatest, the numbers are

$$\sqrt{3}, \sqrt{6}, \sqrt{8}, \pi, \frac{15}{4}$$

**Directions:** for questions 11 and 12, use the number line to order the rational and irrational numbers from least to greatest. Round your work to the nearest hundredth.

11)  $\sqrt{2}$ ,  $-0.9$ ,  $\frac{1}{8}$ ,  $\sqrt{3}$ ,  $-\sqrt{2}$

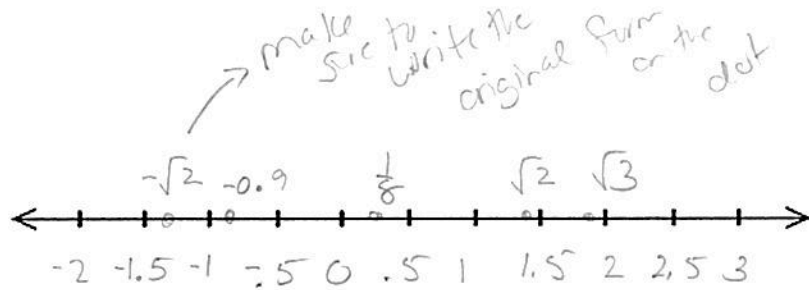
$\sqrt{2} \approx 1.41$

$-0.9 = -0.90$

$\frac{1}{8} = .13$

$\sqrt{3} = 1.73$

$-\sqrt{2} \approx -1.41$



12)  $\sqrt{8}$ ,  $\pi$ ,  $3$ ,  $\sqrt{15}$ ,  $\sqrt{18}$

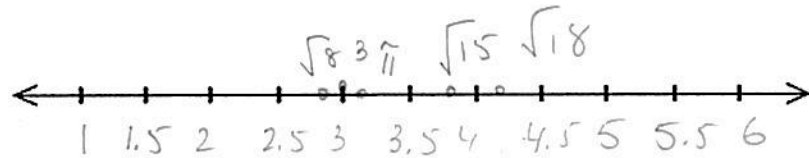
$\sqrt{8} = 2.83$

$\pi = 3.14$

$3 = 3.00$

$\sqrt{15} = 3.87$

$\sqrt{18} = 4.24$



13) Which set of numbers is ordered from greatest to least?

A)  $\pi$ ,  $32\frac{2}{3}\%$ ,  $\frac{7}{3}$ ,  $\sqrt{6}$

B)  $\pi$ ,  $\sqrt{6}$ ,  $\frac{7}{3}$ ,  $32\frac{2}{3}\%$

C)  $\sqrt{6}$ ,  $32\frac{2}{3}\%$ ,  $\frac{7}{3}$ ,  $\pi$

D)  $\frac{7}{3}$ ,  $\pi$ ,  $32\frac{2}{3}\%$ ,  $\sqrt{6}$

$\pi = 3.14$  (2nd)

$32\frac{2}{3}\% = 32.67\% = 0.3267$

$\frac{7}{3} = 2.33$

$\sqrt{6} = 2.45$

(C) together

14) Which set of numbers is ordered from least to greatest?

A)  $27\%$ ,  $2.75$ ,  $\sqrt{2}$ ,  $2\frac{7}{9}$

B)  $27\%$ ,  $\sqrt{2}$ ,  $2.75$ ,  $2\frac{7}{9}$

C)  $\sqrt{2}$ ,  $2\frac{7}{9}$ ,  $2.75$ ,  $27\%$

D)  $2\frac{7}{9}$ ,  $2.75$ ,  $\sqrt{2}$ ,  $27\%$

(C) to get

$27\% = .27$

$2.75 = 2.75$

$\sqrt{2} = 1.41$

$2\frac{7}{9} = 2.78$

15) A carpenter uses four wooden boards with different lengths. The lengths are 4 ft.,  $2\sqrt{3}$  ft.,  $\pi + \sqrt{2}$  ft., and  $1.9^2$  ft. What are the lengths of the boards in order from shortest to longest?

least to greatest

$2\sqrt{3}$  ft.,  $1.9^2$  ft., 4 ft.,  $\pi + \sqrt{2}$  ft.

$4 = 4.00$

$2\sqrt{3} = 3.46$

$\pi + \sqrt{2} = 3.14 + 1.41 = 4.55$

$1.9^2 = 3.61$