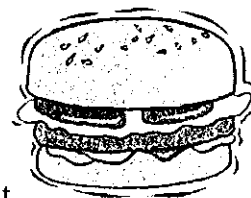


# The Left-Handed Whopper

Name ANSWERS

In 1998, a full-page advertisement in *USA Today* announced that Burger King was introducing a "left-handed Whopper" sandwich designed specifically for the 32 million left-handed Americans. The new Whopper included the same ingredients as the original Whopper, but the toppings were rotated 180 degrees to redistribute their bulk to the left side of the sandwich in an attempt to reduce oozing from the right side of the burger. Thousands of customers flocked to Burger King's restaurants to request the new left-handed Whoppers. Customers also started requesting "right-handed" Whoppers. *(The Burger King advertisement was an April Fool's Day joke!)*



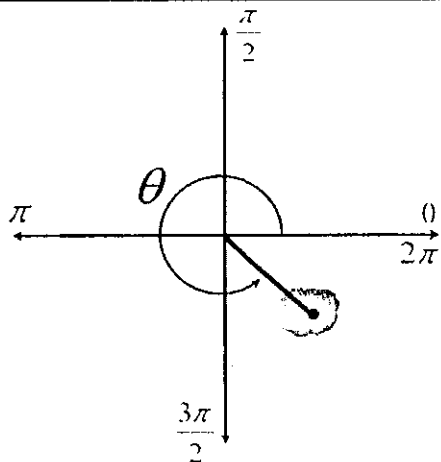
Let's examine the top of the Whopper burger from a trigonometric perspective:

<p><b>1.</b></p> <p>A pickle is located at the coordinates (4,3). State the exact values of the six trigonometric functions of angle <math>\theta</math>.  <math>\sin \theta = 3/5</math>, <math>\cos \theta = 4/5</math>, <math>\tan \theta = 3/4</math>  <math>\csc \theta = 5/3</math>, <math>\sec \theta = 5/4</math>, <math>\cot \theta = 4/3</math>.</p>	<p><b>2.</b></p> <p>A pickle is located at the coordinates <math>(-\sqrt{3}, 1)</math>. State the exact values of the six trigonometric functions of angle <math>\theta</math>.  <math>\sin \theta = 1/2</math>, <math>\cos \theta = -\sqrt{3}/2</math>, <math>\tan \theta = -\sqrt{3}/3</math>  <math>\csc \theta = 2</math>, <math>\sec \theta = -2\sqrt{3}/3</math>, <math>\cot \theta = -\sqrt{3}</math></p>
<p><b>3.</b> A pickle on a Whopper burger lies in the quadrant in which <math>\sin \theta &gt; 0</math> and <math>\cos \theta &lt; 0</math>.</p> <p>a) In which quadrant does the pickle lie? <b>II</b></p> <p>b) If the pickle is rotated 180°, in which quadrant will it lie? <b>IV</b></p>	
<p><b>4.</b> It is observed that onion chips on one Whopper burger lie along the terminal side of angle <math>\theta</math>. This terminal side of <math>\theta</math> lies on the line <math>y = \frac{1}{3}x</math> in quadrant III. Find the exact values of the six trigonometric functions of <math>\theta</math> by finding a point on the line.  <math>\sin \theta = -\sqrt{10}/10</math>, <math>\cos \theta = -3\sqrt{10}/10</math>, <math>\tan \theta = 1/3</math>  <math>\csc \theta = -\sqrt{10}</math>, <math>\sec \theta = -\sqrt{10}/3</math>, <math>\cot \theta = 3</math></p>	

5. The location of a pickle is referenced by an angle  $\theta = \frac{\pi}{4}$ . Evaluate sine, cosine and tangent of this angle without using a calculator.  
 $\sin \theta = \frac{\sqrt{2}}{2}$ ,  $\cos \theta = \frac{\sqrt{2}}{2}$ ,  $\tan \theta = 1$

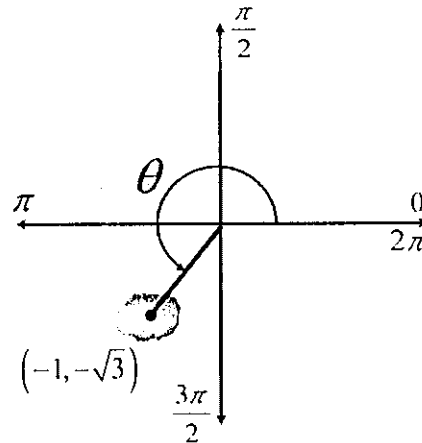
6. The location of a blob of mustard is referenced by an angle  $\theta = -\frac{3\pi}{2}$ . Evaluate sine, cosine and tangent of this angle without using a calculator.  
 $\sin \theta = 1$ ,  $\cos \theta = 0$ ,  $\tan \theta = \text{undefined}$

7.



A pickle lies in quadrant IV and  $\csc \theta = -\sqrt{2}$ . State the values of the remaining five trigonometric functions.  
 $\sin \theta = -\frac{\sqrt{2}}{2}$ ,  $\cos \theta = \frac{\sqrt{2}}{2}$ ,  $\tan \theta = -1$   
 $\csc \theta = -\sqrt{2}$ ,  $\sec \theta = \sqrt{2}$ ,  $\cot \theta = -1$

8.



A pickle is located at coordinates  $(-1, -\sqrt{3})$ .

- What is the positive value of angle  $\theta$ , in radians?  $\frac{4\pi}{3}$
- What is the distance from the pickle's location to the center of the burger at  $(0,0)$ ? 2

9. An onion chip is located on a straight line which coincides with the terminal side of angle  $\theta$ , where  $\tan \theta$  is undefined and  $\pi \leq \theta \leq 2\pi$ . What is the equation of the line containing the onion chip?  $x = 0$

10. A pickle is located on a straight line which coincides with the terminal side of angle  $\theta$ , where  $\sin \theta = 0$  and  $\sec \theta = -1$ . What is the equation of the line containing the pickle?  $y = 0$