

Spring Break Packet for Calculus.

Name: _____

-Complete each problem.

-Clearly box all answers.

-Clearly show all work that leads to the correct answer.

-Due on April 7th. If school is cancelled beyond April 7th you will find directions for additional work (handed out separately today) printed at the end of the break packet.

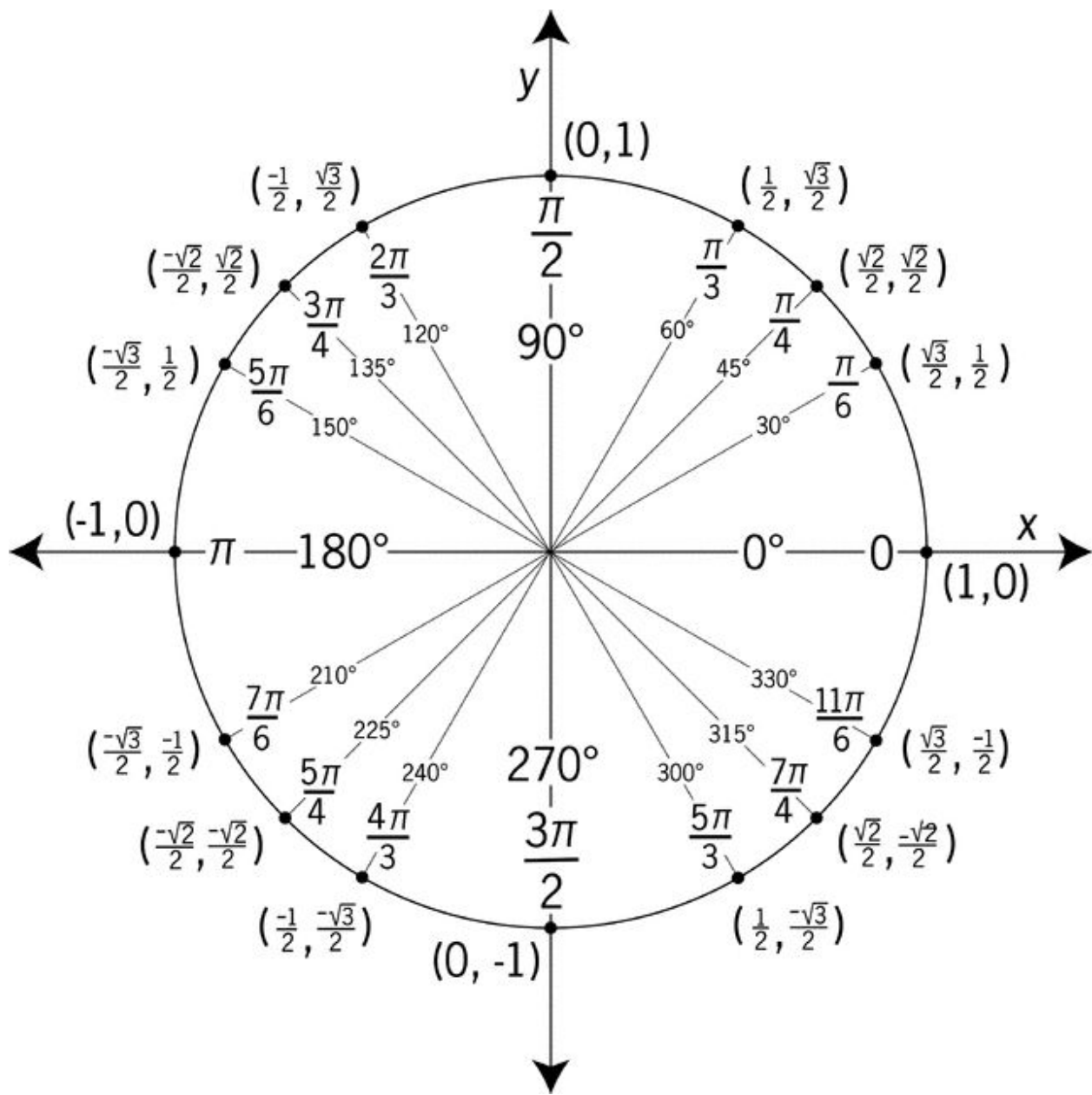
The additional work includes reading and notes from a college course as well as a problem set. I have also included a totally optional review of past content.

-Grading is for accuracy and work completion.

-Turn in any necessary scratch work that doesn't cleanly fit on the packet labelled by problem on a separate sheet of paper.

Grade: _____

Work Habits: _____



1) Answer each question in the cell below

$\sin(90)$	$\cos(180)$	$\tan(45)$	$\sec(300)$	$\csc(225)$	$\cot(60)$
$\sin(1035)$	$\cos(-315)$	$\tan(7\pi/6)$	$\sec(13\pi/6)$	$\csc(-8\pi/3)$	$\cot(-4\pi)$
$\arccos(-1/2)$	$\cos^{-1}(0)$	$\sin^{-1}(\sqrt{2}/2)$	$\sin^{-1}(-\sqrt{3}/2)$	$\arctan(-1)$	$\tan^{-1}(-\sqrt{3})$

2) List 5 points equivalent to the polar point (3, 215)

Requirement:	Point:
Angle is less than 0, $r > 0$	
Angle is greater than 360, $r > 0$	
$r < 0$	
$r < 0$	
Angle is greater than 720	

3) Convert the points $(3, 45)$, $(-2, 180)$ and $(\sqrt{2}, 315)$ from polar to rectangular coordinates in the space below.

Polar point	Finding X	Finding Y	Final Answer
$(3, 45)$			(\quad , \quad)
$(-2, 180)$			
$(\sqrt{2}, 315)$			

3) Convert the points $(\sqrt{2}, \sqrt{2})$, $(-\sqrt{2}, -\sqrt{2})$ and $(-5\sqrt{3}, 5)$ from rectangular to polar coordinates in the space below. Make sure to check your answers!

Cartesian point	Finding R	Finding Theta and checking work.	Final Answer
$(\sqrt{2}, \sqrt{2})$			(\quad , \quad)
$(-\sqrt{2}, -\sqrt{2})$			
$(-5\sqrt{3}, 5)$			

5) On one quiz Mr. Wachtel asked you to convert the cartesian point $(0, 10)$ into polar coordinates. A majority of the class said this had no solution when in fact the answer was $(10, 90^\circ)$. Why did almost everybody get this wrong? And if you think about it or draw a picture why is it really easy? Include at least two full sentences.

Problem	Work	Solution
<p>4) Put vector v with its tail at $(3, 16)$ and its head at $(4, -6)$ into component form.</p>		
<p>5) Find a unit vector in the direction of v. Express your answer as a linear combination of the two unit vectors.</p>		
<p>6) Write down what you could plug in to your calculator to find the angle v makes with the x-axis.</p>		
<p>7) *Above and beyond* Suppose the vector in meters/second represents the velocity of a boat. How fast is the boat travelling north?</p>		

A particle's position along the x-axis is given by $x(t) = \frac{t^3}{3} - \frac{3t^2}{2} + 2t$. The velocity is given by $v(t) = t^2 - 3t + 2$. The acceleration is given by $a(t) = 2t - 3$.

Problem:	Work:	Solution:
7) When is the particle at rest?		
8) At $t = -8$ seconds is the particle speeding up or slowing down?		
9) Calculate the average velocity and average acceleration from 0 to 3 seconds.		

10) Molly the Mouse travels along the x-axis looking for cheese. She sets out traveling right and stops for a moment after 5 seconds to sniff the air, then continues in the same direction. At 10 seconds she finds some cheese and stops to eat it. She does not start moving until 15 seconds. From 15-25 seconds she moves along the y-axis until at 25 seconds she comes to a stop back at her home.

Draw a graph of Molly's *velocity* over time in the space below. Label on your graph when the mouse is at rest and when she is slowing down.