Math 1220-006 (Calculus II), Fall 2016

Homework 11 Grading Key

- Total score = completeness points + correctness points

Completeness (5 points)

10.5 # 1, 5, 7, 9, 11, 13, 15, 17, 19, 21
Total: 10

- Points are awarded based on the following table:

Points	0	1	2	3	4	5
Percentage of problems attempted	<60%	60-69%	70-79%	80-89%	90-99%	100%

- In order for a problem to count as attempted, there must be some kind of work present. Simply writing down the problem doesn't count.

Correctness (5 points)

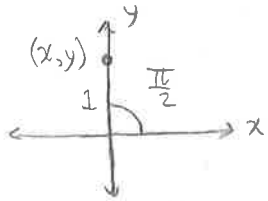
- Every week certain problems are selected for individual grading. Correct answers are only worth a small portion of the points. The majority of the points come from demonstrating conceptual knowledge and showing the calculations or reasoning that led to an answer.

- This week, the following problems were selected for grading:

10.5 #7 (1 point)

Find the Cartesian coordinates of the following points:

a) (0.25 pt.)



$x = 1 \cdot \cos\left(\frac{\pi}{2}\right) = 0$

$y = 1 \cdot \sin\left(\frac{\pi}{2}\right) = 1$

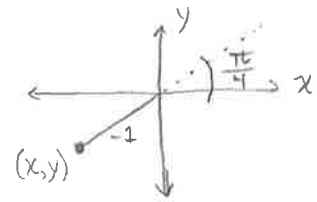
$(0, 1)$

Polar to Cartesian coordinates

$x = r\cos\theta$

$y = r\sin\theta$

b) (0.25 pt.)

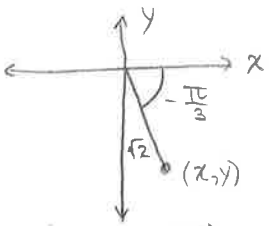


$x = -1 \cdot \cos\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

$y = -1 \cdot \sin\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

$\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

c) (0.25 pt.)

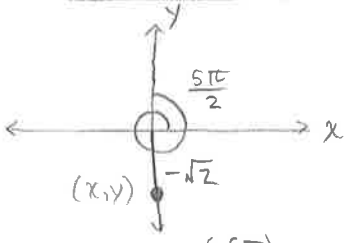


$x = \sqrt{2}\cos\left(-\frac{\pi}{3}\right) = \frac{\sqrt{2}}{2}$

$y = \sqrt{2}\sin\left(-\frac{\pi}{3}\right) = -\frac{\sqrt{3}\cdot\sqrt{2}}{2}$

$\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{6}}{2}\right)$

d) (0.25 pt.)



$x = -\sqrt{2} \cdot \cos\left(\frac{5\pi}{2}\right) = 0$

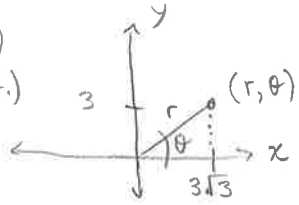
$y = -\sqrt{2}\sin\left(\frac{5\pi}{2}\right) = -\sqrt{2}$

$(0, -\sqrt{2})$

10.5 #9 (1 point)

Find the polar coordinates of the following points:

a) (0.25 pt.)



$r = \sqrt{(3\sqrt{3})^2 + 3^2} = \sqrt{36} = 6$

$\theta = \tan^{-1}\left(\frac{3}{3\sqrt{3}}\right) = \frac{\pi}{6}$

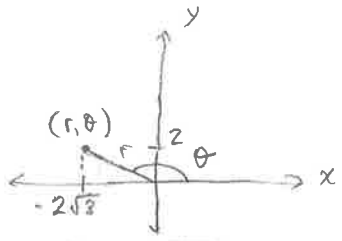
$\left(6, \frac{\pi}{6}\right)$

Cartesian to polar coordinates

$r^2 = x^2 + y^2$

$\tan\theta = \frac{y}{x}$

b) (0.25 pt.)

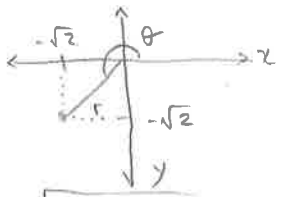


$r = \sqrt{(-2\sqrt{3})^2 + 2^2} = \sqrt{16} = 4$

$\theta = \tan^{-1}\left(\frac{2}{-2\sqrt{3}}\right) = -\frac{\pi}{6}, \frac{5\pi}{6}$

$\left(4, \frac{5\pi}{6}\right)$

c) (0.25 pt.)

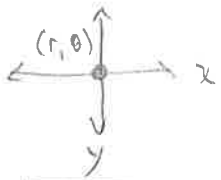


$\left(2, \frac{5\pi}{4}\right)$

$r = \sqrt{(-\sqrt{2})^2 + (-\sqrt{2})^2} = \sqrt{4} = 2$

$\theta = \tan^{-1}\left(\frac{-\sqrt{2}}{-\sqrt{2}}\right) = \frac{\pi}{4}, \frac{5\pi}{4}$

d) (0.25 pt.)



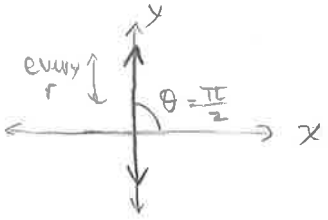
$r = \sqrt{0^2 + 0^2} = 0$

Any choice of θ will suffice

$(0, \theta)$

10.5 #17 2 points

Find the Cartesian equation of the polar graph $\theta = \frac{\pi}{2}$



Clearly the equation is $x = 0$.

But you can confirm by using the conversions:

$x = r\cos\left(\frac{\pi}{2}\right) = 0$

$y = r\sin\left(\frac{\pi}{2}\right) = r$

x must be zero while there is no restriction on y.

And finally, this week I am awarding one free point to everyone for their Correctness score.