Math 229: Homework Set 4 **Name:**________________________________

_________/ 20 **Class time:** ____________________________

Requirements: In order to receive credit on homework problems, you must

- Write down the original problem, within reason.
- Work out the problem, clearly showing your work.
- Check your answer in the back of the book. If your answer is incorrect, then you need to go back to find and fix the error.

Self-Assessment: Determine total number of correctly done problems (they don't have to be done correctly the first time…just make sure you find and fix any errors in your work!) and put that score in the last column.

If you give credit for a problem that hasn't been completed, you will lose 1 point on the overall grade (for example, if you put down 9/9 in Assignment 1 but have completed only 6 problems, your entire score on the homework packet will lose 3 points). **Please be honest and accurate in your assessment.**

Homework is due on the day of the exam.

	Read this section:	**Do these problems:**	**Completed/ Total**
1	**Section 10.1: Law of Sines** Read pages 762 - 767	10.1 Exercises, page 770: • Concepts: 1 • Solving Triangles AAS: 7 • Solving Triangles ASS: #15 (solve only for Angle B) #17 (solve only for Angle C, both solutions!) #19 (solve only for Angle C, both solutions!) #23 (solve only for Angle A, if possible) • Solving from a sketch: 31, 37, 41 **Answers for JUST the angles in #15 - #23 (the other odd answers are in the back of the book).** #15: angle B = 16.7^{O} #17: angle C = 54.3^{O} or angle C = 125.7^{O} #19: angle C = 61.3^{O} or angle C = 118.7^{O} #23 : side b is too short! There is no solution to this triangle!	/9
2	**Section 10.2: Law of Cosines** Read pages 776 - 779	10.2 Exercises, page 783: • Concepts: 1, 4, 5 • Solving SSS triangles: 17, 19 • Solving SAS triangles: 21 • Finding missing sides or angles: 39, 45 • Geometry: 55	/9
3	**Sections 10.1 and 10.2: Applications** Read pages 769, 779 -781	10. 1 Exercises, page 773: 63, 69 10.2 Exercises, page 786: 63, 71	/4

4	**Section 10.3: Polar Coordinates** Read pages 788 - 796	10.3 Exercises, page 797: **(Note: For best results, do problems in the given order!)** • Concepts: 4, 5 (for #4 and #5, plot both points!) • Plot points: 47, 49, 51, 53 • Point Conversions (be sure to plot the point for each of these problems!): 6, 8, 9, 11, 13, 15 • Equation Conversions: Use Desmos to graph each equation and the converted equation to confirm the equations describe the same graph. 16, 17, 18, 20, 21, 24 • Graphing in Polar: You do NOT have to convert these equations to rectangular coordinates…just graph using methods shown in class! 62, 64, 65, 66	☐ /22
4	**Section 10.4: Polar Graphs** Read pages 799 – 812	10.4 Exercises, page 813: • Graphing polar equations by hand. Use the polar graph paper provided in class. Plot several points AND use the Summary of Polar Graphs handout to graph these equations. Do NOT convert to rectangular coordinates! Check your graph using Desmos. 16, 17, 19, 21, 23, 25, 27, 31, 33, 37, 38, 39 • Graphing using only technology. Graph using Desmos, sketch a rough graph on regular paper, then observe and describe the patterns you see. 54, 61, 63	☐ /15

5	**Section 10.5: Polar Form of Complex Numbers**
	
	Read pages 815 - 820
		10.5 Exercises, page 824:
		• Concepts: 2
		• Complex Numbers in Polar Form
		    o Graphing: 47, 49, 51, 53
		    o Algebra: Note: For best understanding, GRAPH each complex number, then you will be able to do the problem by inspection rather than by using formulas!
		    7, 9, 13, 15, 17, 19
			☐ /11

6	**Section 10.8: Vectors** Read pages 847 - 860	10.8 Exercises, page 861 • Concepts: 1, 2, 3, 5 • Finding vectors from points: Include a GRAPH for each of these problems! 47, 49, 7, 9, 11, 13 • Vector addition and scalar multiplication: Include a GRAPH! 17, 19, 21, 23, 27, 37, 39, 41, 43, 45, • Convert component form to polar form: Include a GRAPH! 29, 31, 51, 53 • Dot Product: 33, 35	☐ /26
7	**Section 10.8: Vector Applications**	10.8 Exercises, page 863: 55, 61, 67, 79	☐ /4

Even answers:

Section 10.2:

#4: Explain the relationship between the Pythagorean Theorem and the Law of Cosines.

The Law of Cosines is a form of the Pythagorean Theorem that adjusts for the non-right triangle. If you substitute the angle in the Law of Cosines with $90°$, and simplify, the Pythagorean Theorem would be the result. The Law of Cosines can be derived from a non-right triangle using trigonometry and the altitude of the triangle.

Section 10.3:

#4: How are the points $\left(3, \frac{\pi}{2}\right)$ and $\left(-3, \frac{\pi}{2}\right)$ related?

They are both the same distance from the pole, but $\left(3, \frac{\pi}{2}\right)$ lies 3 units above the polar axis, and $\left(-3, \frac{\pi}{2}\right)$ lies 3 units below the pole.

#6 $\left(7, \frac{7\pi}{6}\right)$ ➡

$$x = r\cos\theta$$
$$x = 7\cos\left(\frac{7\pi}{6}\right) = 7\cdot\left(-\frac{\sqrt{3}}{2}\right) = -\frac{7\sqrt{3}}{2}$$
$$y = r\sin\theta$$
$$y = 7\sin\left(\frac{7\pi}{6}\right) = 7\cdot\left(-\frac{1}{2}\right) = -\frac{7}{2}$$

➡ $\left(-\frac{7\sqrt{3}}{2}, -\frac{7}{2}\right)$

#8: $\left(6, -\frac{\pi}{4}\right)$ ➡

$$x = r\cos\theta$$
$$x = 6\cos\left(-\frac{\pi}{4}\right) = 6\cdot\left(\frac{\sqrt{2}}{2}\right) = 3\sqrt{2}$$
$$y = r\sin\theta$$
$$y = 6\sin\left(-\frac{\pi}{4}\right) = 6\cdot\left(-\frac{\sqrt{2}}{2}\right) = -3\sqrt{2}$$

➡ $\left(3\sqrt{2}, -3\sqrt{2}\right)$

#16: $x = 3$ ➡

$$x = r\cos\theta$$
$$3 = r\cos\theta$$
$$r = 3\cdot\frac{1}{\cos\theta}$$

➡ $r = 3\sec\theta$

#18 $y = 4x^2$ ➡

$$r\sin\theta = 4\left(r\cos\theta\right)^2$$
$$r\sin\theta = 4r^2\cos^2\theta$$
$$\frac{\sin\theta}{4\cos^2\theta} = r$$

➡ $r = \frac{\sin\theta}{4\cos^2\theta}$

#20 $x^2+y^2=4y$

$$x^2+y^2=r^2$$
$$y=r\sin\theta$$
$$r^2=4r\sin\theta$$

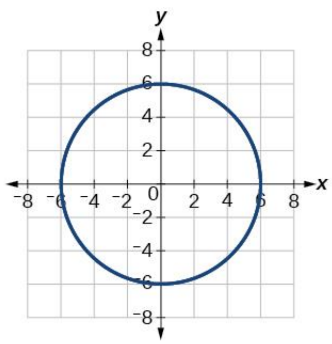
$$r=4\sin\theta$$

#24: $x^2+y^2=9$

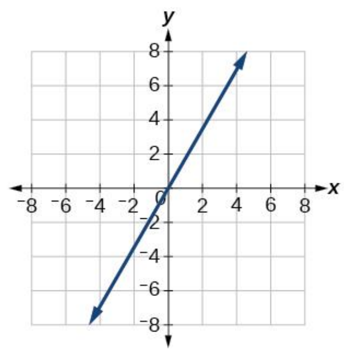
$$x^2+y^2=r^2$$
$$r^2=9$$

$$r=3$$

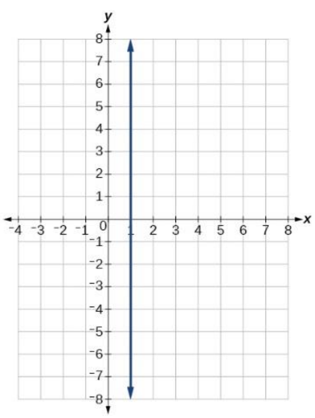
#62:



#64:



#66:



Section 10.4: Check your graphs using Desmos.

Section 10.5:
#2: The absolute value of a complex number is the distance from the origin to the point plotted in the complex plane. You can find the absolute value by using the distance formula or just the Pythagorean Theorem!

Section 10.8:
#2: A vector has both a magnitude and a direction. If you put a directional arrow on a line segment it can be considered a vector.