

Name: _____ Class: _____

Honors Pre-Calculus Homework Packet: UNIT 6 Applications of Trigonometry

6.1

If $P(-2, 2)$, $Q(3, 4)$, $R(-2, 5)$, and $S(2, -8)$, find the component form and magnitude of the following

1. \overrightarrow{PS} 2. \overrightarrow{RQ} 3. $2\overrightarrow{QP} - \overrightarrow{SR}$

Find a unit vector on the same direction as the given vector

4. $v = \langle -3, 4 \rangle$ 5. $v = \langle 1, -6 \rangle$

Find the component form of a vector with the following characteristics.

6. Magnitude = 5, $\theta = 60^\circ$ 7. Magnitude = 33, $\theta = \frac{3\pi}{4}$

Find the magnitude and direction angle of each vector.

8. $v = \langle -5, 7 \rangle$ 9. $v = \langle 15, -1 \rangle$ 10. $v = \langle -6, -2 \rangle$ 11. $v = \langle 18, 20 \rangle$
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6.2

Find the dot product of the two vectors.

1. $u = \langle 5, 3 \rangle, v = \langle 12, 4 \rangle$ 2. $u = \langle -5, 2 \rangle, v = \langle 8, 13 \rangle$ 3. $u = 2i - 4j, v = -8i + 7j$

Find the angle between the two vectors.

4. $u = \langle -4, -3 \rangle, v = \langle -1, 5 \rangle$ 5. $u = \langle 5, 2 \rangle, v = \langle -6, -1 \rangle$

Determine if the vectors are parallel, orthogonal, or neither.

6. $u = \langle 5, 3 \rangle, v = \langle -\frac{10}{4}, -\frac{3}{2} \rangle$ 7. $u = \langle -3, 4 \rangle, v = \langle 20, 15 \rangle$

Find the interior angles of the triangle with the given vertices

8. $(-4, 1), (1, -6), (5, -1)$

Find the vector projection of vector u onto vector v .

9. $u = \langle -8, 3 \rangle, v = \langle -6, -2 \rangle$ 10. $u = \langle 3, -7 \rangle, v = \langle -2, -6 \rangle$
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6.3

Use the parametric equations to complete the charts

1. $x = t + 2, y = 1 + \frac{3}{t}$

t	-2	-1	0	1	2
x					
y					

2. $x = \cos t, y = \sin t$

t	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
x					
y					

Eliminate the Parameter.

3. $x = 2 - 3t, y = 5 + t$

4. $x = 2t^2 + 1, y = -4t$

5. $x = 5 \cos t, y = 5 \sin t$

Use the intervals to state the restrictions on x and y.

6. $x = 5 - 3t, y = 2 + t, 3 \leq t \leq 5$

7. $x = -4t + 1, y = 2\sqrt{t-3}, -1 \leq t \leq 3$

Read the following word problems and then answer the questions that follow

8. A baseball is hit 5ft above the ground at an angle of 54° , an initial velocity of 80ft/sec, and a gust of wind against the ball at 3ft/sec.

- a. Write the parametric equations that simulate the ball's position at any given time.
- b. What is the height of the ball after 4 seconds?
- c. Will the ball clear a fence that is 200ft away and 35ft tall?

9. Tony and Sue are launching yard darts 20ft from the edge of a circular target lying on the ground with radius of 1.5ft. If Tony throws the dart directly at the target, and releases it 3ft above the ground with an initial velocity of 30ft/sec at a 70° angle, will the dart hit the target?

6.4

Plot the following points on the polar graph.

1. $(3, \frac{2\pi}{3})$

2. $(-4, \frac{5\pi}{4})$

3. $(1, -120^\circ)$

4. $(-7, -510^\circ)$

Convert the polar points to rectangular.

5. $(2, \frac{5\pi}{6})$

6. $(-7, -\frac{\pi}{3})$

Convert the rectangular points to polar.

Give all 4 possibilities.

7. $(-1, -4)$

8. $(5, -2)$

Convert the polar equation to rectangular.

9. $r = -4 \cos \theta$

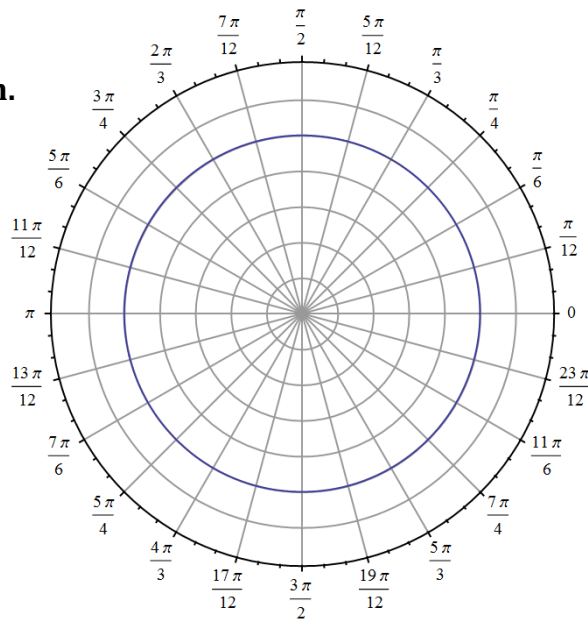
10. $r = 2 \sin \theta - 10 \cos \theta$

11. $\theta = -\frac{\pi}{6}$

Convert the rectangular equation to polar.

12. $y = 5x - 2$

13. $(x - 4)^2 + (y - 3)^2 = 25$



6.6

Find the trigonometric form of each complex number.

1. $4 - 7i$ 2. $-2 - 2i$ 3. $\sqrt{3} + 5i$

Write the complex number in standard form.

4. $8(\cos 210^\circ + i \sin 210^\circ)$ 5. $\sqrt{2}(\cos \frac{7\pi}{6} + i \sin \frac{7\pi}{6})$

Find the product of the two complex numbers. Leave answer in trig form.

6. $5(\cos 118^\circ + i \sin 118^\circ) \cdot 2(\cos(-19)^\circ + i \sin(-19)^\circ)$

Find the quotient of the two complex numbers. Leave answer in trig form.

7. $51(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4}) \div 17(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6})$

Use DeMoivre's Theorem to find the power of the complex number. Write answer in standard form.

8. $\left[3\left(\cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6}\right)\right]^3$ 9. $\left[-2\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}\right)\right]^5$