Precalculus
Chapter 6 Review

Name:
Period:

**(#1-2) Let u = <-4, -1>, v = <1, 3>, and w = <-6, -3>. ****

1. v + w

$\langle -5, 0 \rangle$

2. u + 2v - w

$\langle 4, 8 \rangle$

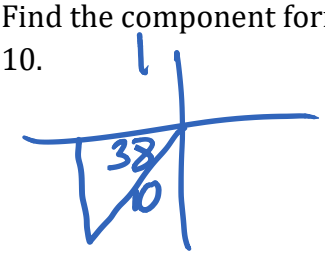
3. Find the component form of a vector $\overrightarrow{AB}$ with A = (4, -3) and B = (-2, -2). **

$\langle -6, 1 \rangle$

4. Find the magnitude and direction angle of the vector in #3.

$|v| = \sqrt{37}$ $\theta = 170.54^\circ$

5. Find the component form of a vector with a direction angle of 218 degrees and magnitude of 10.




$\langle -7.88, -6.16 \rangle$

6. A ship sails at a bearing of 40 degrees and at a speed of 30 mph. Find the component form for the velocity of the ship.

$\langle 19.28, 22.98 \rangle$
East North

**(#7-8) Eliminate the parameter and identify the type of graph it is.**

7. $x = 2t^2 + 3$, $y = t - 1$ **

$t = \pm\sqrt{\frac{x-3}{2}}$ $y = \pm\sqrt{\frac{x-3}{2}} - 1$

8. x = 3cost, y = 3sint **

Circle! $x^2 + y^2 = 9$

**(#9-10) Find a parametrization for each. Be sure to state the limits on T.**

9. The line *segment* through points (-5, 5) and (1, 3). **

$\langle 6, -2 \rangle$

$$\left.\begin{aligned} x &= -5 + 6t \\ y &= 5 - 2t \end{aligned}\right\} \quad 0 \le t \le 1$$

10. A circle with radius of 6 and center at (4, 5). **

$x = 4 + 6\cos t$

$y = 5 + 6\sin t$

11. Sara and Val are running a race. Sara can run 13 meters per second and Val can run 15 meters per second. Val starts 3 seconds after Sara. If the race is 150 meters long, who wins the race? Where is the loser of the race when the winner crosses the finish line?

Sara by 1.5 sec

Sara:

X = $13t$

Y = $3$

Val:

X = $15(t-3)$

Y = $5$

12. Spencer practices kicking field goals 40 yards from a goal post with a crossbar that is 10 feet high. If he kicks the ball with an initial velocity of 60 feet per second at a 47 degree angle with the ground, will he make a field goal (clear the cross bar)? Prove it!

No! Ball lands 7.8 ft from F.G.

Football:

X = $60 \cdot \cos 47 \cdot t$

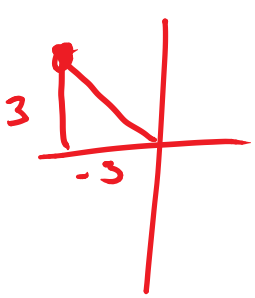
Y = $-16t^2 + (60 \sin 47) \cdot t$

$t = 2.93$ sec $\rightarrow y = -8.9$ ft

or $t = 2.74$ when $y = 0$

So....

13. Change (-3, 3) to Polar Coordinates. Give two answers – one with a positive r and one negative r. **

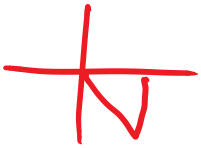



$(3\sqrt{2}, 135)$ $(-3\sqrt{2}, 315^\circ)$

or

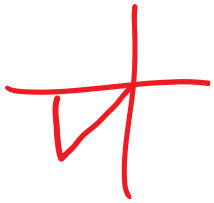
$\left(3\sqrt{2}, \frac{3\pi}{4}\right)$ $\left(-3\sqrt{2}, \frac{7\pi}{4}\right)$

14. Change (2, -5) to Polar Coordinates. Give two answers – one with a positive r and one with a negative r.



$(\sqrt{29}, 291.8°)$ & $(-\sqrt{29}, 111.8°)$

15. Change (4, 210°) to rectangular coordinates. **



$(-2\sqrt{3}, -2)$

16. Change (12, -250°) to rectangular coordinates.

$x = 4.10$

$y = 11.28$

$(-4.10, 11.28)$

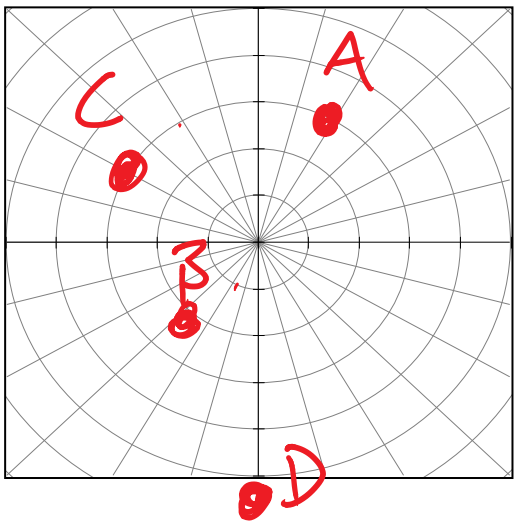
17. Plot the points on the polar grid. Label all points. **

A. $\left(3, \frac{\pi}{3}\right)$

B. $(1, -135^\circ)$

C. $(-3, 330^\circ)$

D. $(-5, -\frac{3\pi}{2})$

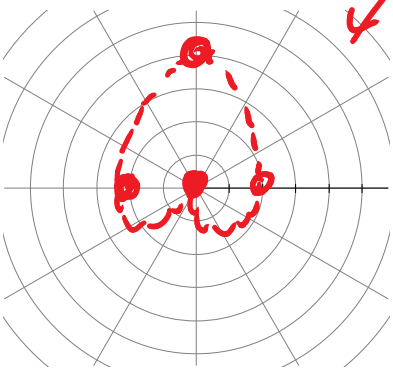



(#18-21) Identify each of the following as a line, circle, rose, cardioid, or limaçon. Then graph each equation.

18. $r(\theta) = 4 + 4\sin\theta$ **

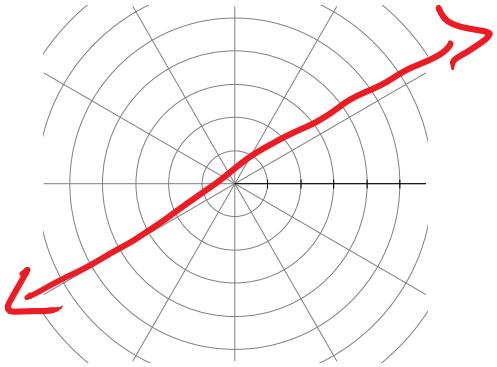
cardiod

count every 2

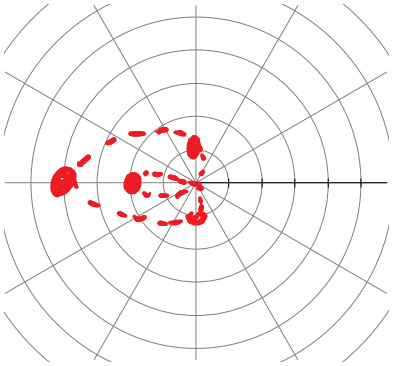


19. $\theta = \frac{\pi}{6}$ **

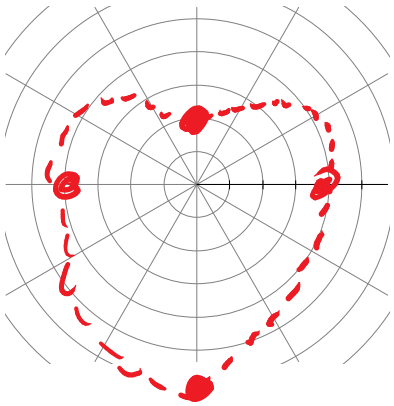
line



20. $r(\theta) = 1 - 3\cos\theta$ ** limacon



21. $r(\theta) = 4 - 2\sin\theta$ ** limacon



22. Write the equation of a limaçon that has x-intercepts at 4 and -4, and y-intercepts at 5 and -3. **

$$\boxed{r = 4 + 1\sin\theta}$$

$4 + x = 5$

$x = 1$

23. Write the equation of a circle that lays on the negative y-axis, with y-intercepts of 0 and -10. **

$r = -10\sin\theta$

24. Things I need to review: