Precalculus

Name_____ Date_____ Per_____

Find the component form of the vector with the given magnitude and direction angle

1. $|\mathbf{v}| = 27.3, \ \theta = 214.9°$

Find the magnitude and direction angle of the vector. Give the measure of the direction angle as an angle in $[0°, 360°)$.

2. $\langle 4, -6 \rangle$

Perform the indicated operation. Use the form $\langle a, b \rangle$ for vectors. $\mathbf{u} = \langle -1, 5 \rangle, \ \mathbf{v} = \langle 4, -7 \rangle$

3. Find $3\mathbf{u} - \mathbf{v}$ 4. Find $\mathbf{u} \cdot \mathbf{v}$

Find the smallest positive angle between the given vectors to the nearest tenth of a degree.

5. $\langle -6, 8 \rangle$ and $\langle 5, -1 \rangle$

Determine whether the vectors are parallel, perpendicular, or neither.

6. $\langle 2, -4 \rangle$ and $\langle 6, 3 \rangle$ 7. $\langle 9, 1 \rangle$ and $\langle 1, 9 \rangle$ 8. $\langle -1, 7 \rangle$ and $\langle 3, -21 \rangle$

Solve the problems.

9. One rope pulls a barge due east with a force of 75 N, and another rope pulls the barge due south with a force of 87 N. Find the magnitude of the resultant force acting on the barge and the angle between the resultant force and the smaller force.

10. Find the force required to keep a 50-lb wagon from sliding down a ramp inclined at 20° to the horizontal.

11. An airplane flies due east at 375 mph. The wind affecting the plane is blowing <u>from</u> 295° at 43 mph. What is the true course and ground speed of the airplane? Round to the nearest tenth.

Perform the indicated operation. Write the answer in the form $a+bi$.

12. $4(\cos 80° + i\sin 80°)\cdot 3(\cos 130° + i\sin 130°)$

13. $\dfrac{7(\cos \frac{5\pi}{6} + i\sin \frac{5\pi}{6})}{2(\cos \frac{\pi}{3} + i\sin \frac{\pi}{3})}$

Use De Moivre's Theorem to simplify the expression. Write the answer in $a+bi$ form.

14. $\left(-4+4i\sqrt{3}\right)^4$

15. $\left(2-2i\right)^5$

Find the indicated roots. Write the answers in trigonometric form.

16. Fourth roots of $81\left(\cos 280° + i\sin 280°\right)$

Solve the equation. Write the answer in $a+bi$ form. Give exact answers (no calculator).

17. $x^3 + 64 = 0$

18. $x^2 + 18i = 0$

Convert the rectangular coordinates to polar coordinates, using radian measure for the angle.

19. $\left(-5,-5\right)$

20. $\left(-4,0\right)$

Plot the point whose polar coordinates are given.

21. $\left(2,-\dfrac{2\pi}{3}\right)$

22. $\left(4,\dfrac{5\pi}{6}\right)$

23. $\left(-3,210°\right)$

Convert to rectangular coordinates.

24. $\left(-2, \dfrac{3\pi}{4}\right)$

25. $\left(3, -\dfrac{1}{2}\pi\right)$

26. $\left(-4, \dfrac{4\pi}{3}\right)$

Graph the polar equation.

27. $r = 3 - 3\cos\theta$

28. $r = 4\sin(3\theta)$

For the given polar equation, write an equivalent rectangular equation.

29. $r = 5\cos\theta$

For the given rectangular equation, write an equivalent polar equation.

30. $x = 5$

Eliminate the parameter of the pair of parametric equations.

31. $x = t + 5,\ y = t^2 + 3$

32. $x = 4\cos\theta,\ y = \sin\theta$

Write a pair of parametric equations that will produce the indicated graph.

33. The line segment starting at $(1, -2)$ with $t = 0$ and ending at $(13, 1)$ with $t = 3$.