Trig
Chapter Ten Review Part 2

Name:_____

Polar Form of Complex Numbers

For the following exercises, find the absolute value of each complex number.

28. $-2+6\mathbf{i}$

29. $4-3\mathbf{i}$

Write the complex number in polar form.

30. $5+9\mathbf{i}$

31. $\frac{1}{2}-\frac{\sqrt{3}}{2}\mathbf{i}$

For the following exercises, convert the complex number from polar to rectangular form.

32. $z=5\operatorname{cis}\left(\frac{5\pi}{6}\right)$

33. $z=3\operatorname{cis}(40°)$

For the following exercises, find the product $z_1 z_2$ in polar form.

34. $z_1=2\operatorname{cis}(89°)$
$z_2=5\operatorname{cis}(23°)$

35. $z_1=10\operatorname{cis}\left(\frac{\pi}{6}\right)$
$z_2=6\operatorname{cis}\left(\frac{\pi}{3}\right)$

For the following exercises, find the quotient $\frac{z_1}{z_2}$ in polar form.

36. $z_1 = 12\,\text{cis}\,(55°)$
$z_2 = 3\,\text{cis}\,(18°)$

37. $z_1 = 27\,\text{cis}\left(\frac{5\pi}{3}\right)$
$z_2 = 9\,\text{cis}\left(\frac{\pi}{3}\right)$

For the following exercises, find the powers of each complex number in polar form.

38. Find z^4 when
$z = 2\,\text{cis}\,(70°)$

39. Find z^2 when
$z = 5\,\text{cis}\left(\frac{3\pi}{4}\right)$

For the following exercises, evaluate each root.

40. Evaluate the cube root of z when $z = 64\,\text{cis}\,(210°)$.

41. Evaluate the square root of z when $z = 25\,\text{cis}\left(\frac{3\pi}{2}\right)$.

For the following exercises, plot the complex number in the complex plane.

42. $6 - 2\mathbf{i}$

43. $-1 + 3\mathbf{i}$

Parametric Equations

For the following exercises, eliminate the parameter t to rewrite the parametric equation as a Cartesian equation.

44. $\begin{cases} x(t) = 3t - 1 \\ y(t) = \sqrt{t} \end{cases}$

45. $\begin{cases} x(t) = -\cos\ t \\ y(t) = 2\sin^2 t \end{cases}$

46. Parameterize (write a parametric equation for) each Cartesian equation by using $x(t) = a\cos\ t$ and $y(t) = \mathbf{b}\sin\ t$ for $\frac{x^2}{25} + \frac{y^2}{16} = 1$.

47. Parameterize the line from $(-2, 3)$ to $(4, 7)$ so that the line is at $(-2, 3)$ at $t = 0$ and $(4, 7)$ at $t = 1$.

Parametric Equations: Graphs

For the following exercises, make a table of values for each set of parametric equations, graph the equations, and include an orientation; then write the Cartesian equation.

48. $\begin{cases} x(t) = 3t^2 \\ y(t) = 2t - 1 \end{cases}$

49. $\begin{cases} x(t) = e^t \\ y(t) = -2e^{5\ t} \end{cases}$

50. $\begin{cases} x(t) = 3\cos\ t \\ y(t) = 2\sin\ t \end{cases}$

51. A ball is launched with an initial velocity of 80 feet per second at an angle of 40° to the horizontal. The ball is released at a height of 4 feet above the ground.

ⓐ Find the parametric equations to model the path of the ball.
ⓑ Where is the ball after 3 seconds?
ⓒ How long is the ball in the air?

Vectors

For the following exercises, determine whether the two vectors, $\mathbf{u}$ and $\mathbf{v}$, are equal, where $\mathbf{u}$ has an initial point P_1 and a terminal point P_2, and $\mathbf{v}$ has an initial point P_3 and a terminal point P_4.

52. $P_1 = (-1, 4)$, $P_2 = (3, 1)$, $P_3 = (5, 5)$ and $P_4 = (9, 2)$

53. $P_1 = (6, 11)$, $P_2 = (-2, 8)$, $P_3 = (0, -1)$ and $P_4 = (-8, 2)$

For the following exercises, use the vectors $\mathbf{u} = 2\mathbf{i} - \mathbf{j}$, $\mathbf{v} = 4\mathbf{i} - 3\mathbf{j}$, and $w = -2\mathbf{i} + 5\mathbf{j}$ to evaluate the expression.

54. $\boldsymbol{u} - \boldsymbol{v}$

55. $2\boldsymbol{v} - \boldsymbol{u} + \boldsymbol{w}$

For the following exercises, find a unit vector in the same direction as the given vector.

56. $\boldsymbol{a} = 8\boldsymbol{i} - 6\boldsymbol{j}$

57. $\boldsymbol{b} = -3\boldsymbol{i} - \boldsymbol{j}$

For the following exercises, find the magnitude and direction of the vector.

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

59. $\langle -3, -3 \rangle$

For the following exercises, calculate $\mathbf{u} \cdot \mathbf{v}$.

60. $\boldsymbol{u} = -2\boldsymbol{i} + \boldsymbol{j}$ and $\boldsymbol{v} = 3\boldsymbol{i} + 7\boldsymbol{j}$

61. $\boldsymbol{u} = \boldsymbol{i} + 4\boldsymbol{j}$ and $\boldsymbol{v} = 4\boldsymbol{i} + 3\boldsymbol{j}$

62. Given $\boldsymbol{v} = \langle -3, 4 \rangle$ draw $\boldsymbol{v}$, $2\boldsymbol{v}$, and $\frac{1}{2}\boldsymbol{v}$.