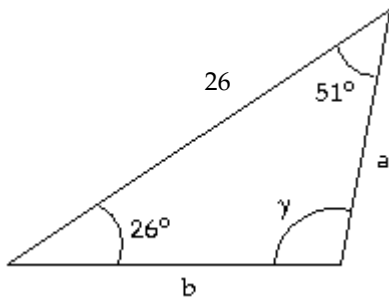


5.1 Solve the triangle with the given parts.

1)



2) $\alpha = 37.8^\circ$, $b = 16.4$, $\gamma = 92.2^\circ$

Determine the number of triangles with the given parts.

3) $b = 44$, $c = 54$, $\beta = 108^\circ$

4) $b = 24$, $c = 28$, $\beta = 45^\circ$

5) $a = 24$, $b = 20$, $\alpha = 43^\circ$

Solve the triangle. If there is more than one triangle with the given parts, give both solutions.

6) $\beta = 27.5^\circ$

$b = 15.25$

$a = 16.51$

Solve the problem.

7) A guy wire to a tower makes a 75° angle with level ground. At a point 40 ft farther from the tower than the wire but on the same side of the base as the wire, the angle of elevation to the top of the pole is 33° . Find the wire length (to the nearest foot).

8) A sailboat leaves port on a bearing of $S72^\circ W$. After sailing for two hours at 12 knots, the boat turns 90° toward the south. After sailing for three hours at 9 knots on this course, what is the bearing to the ship from port? Round your answer to the nearest 0.1° .

5.2 Solve the triangle with the given information.

9) $\beta = 63.5^\circ$

$a = 12.20$

$c = 7.80$

Solve the triangle with the given information.

10) $a = 6.6$

$b = 13.7$

$c = 16.3$

Determine the number of triangles with the given parts.

11) $a = 20$, $b = 15$, $c = 17$

12) $b = 10, c = 5, \gamma = 32^\circ$

Solve the problem.

13) A ship travels 88 km on a bearing of 15° , and then travels on a bearing of 105° for 153 km. Find the distance of the end of the trip from the starting point, to the nearest kilometer.

14) Two boats leave a dock together, each traveling in a straight line. One boat travels at 34 mph and the other at 23 mph. If the angle between their courses measures 31.6° , how far apart are they after 40 minutes? Give your answer in miles and round your answer to the nearest tenth.

5.3 Find the area of triangle ABC.

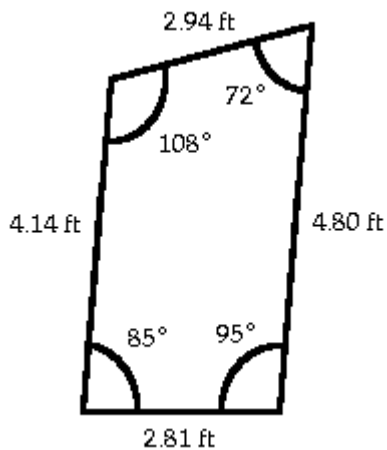
15) $\beta = 60.8^\circ$

$a = 36.2$

$c = 45.7$

Solve the problem.

16) Find the area of the region.



Find the area of the triangle using Heron's formula. Round to the nearest unit.

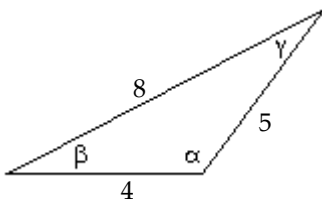
17) $a = 52.9$

$b = 65.4$

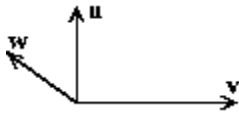
$c = 36.4$

Find the area of the triangle. If necessary, round the answer to two decimal places.

18)



5.4 The vectors u , v , and w are drawn below. Sketch the specified vector.



19) $u + w$

20) $u - v$

Find the magnitudes of the horizontal and vertical components for the vector v with the given magnitude and given direction angle. Round to an appropriate number of significant digits.

21) $|v| = 107.7$, $\theta = 111.2^\circ$

Find the magnitude and direction angle (to the nearest tenth) of the vector. Give the measure of the direction angle as an angle in $[0^\circ, 360^\circ)$.

22) $\langle -12, 5 \rangle$

Find the component form for the vector v with the given magnitude and direction angle θ .

23) $|v| = 106.7$, $\theta = 302.3^\circ$

Perform the indicated operation. Use the form $\langle a, b \rangle$ for vectors.

24) $u = \langle 1, -4 \rangle$, $v = \langle -6, -5 \rangle$; Find $u + v$.

25) $u = \langle -5, -6 \rangle$, $v = \langle 8, 3 \rangle$; Find $u - v$.

26) $v = \langle 2, 6 \rangle$; Find $10v$.

27) $v = \langle 8, -2 \rangle$, $u = \langle 9, -2 \rangle$; Find $6v - 6u$.

28) $u = \langle -5, 5 \rangle$, $v = \langle 15, -8 \rangle$; Find $u \cdot v$.

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

29) $\langle -3, -5 \rangle$, $\langle -2, 6 \rangle$

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

30) $v = \langle 3, 2 \rangle$, $w = \langle 2, -3 \rangle$

31) $v = \langle 4, -1 \rangle$, $w = \langle 8, -2 \rangle$

Write the vector as a linear combination of the unit vectors i and j .

32) $\langle 6, -6 \rangle$

Solve the problem.

33) If $A = \langle 2, 1 \rangle$ and $B = \langle -1, 2 \rangle$, find the magnitude and direction angle for $-4A - 3B$.

Find the magnitude of the resultant vector.

34) $u = 9i + j$ and $v = 5i + j$

5.5 Solve.

- 35) Two forces of 70 N and 90 N (newtons) act on an object. The angle between the forces is 21° . Find the magnitude of the resultant and the angle that it makes with the smaller force.

Solve the problem.

- 36) An airplane flies on a compass heading of 90.0° at 370 mph. The wind affecting the plane is blowing from 318° at 42.0 mph. What is the true course and ground speed of the airplane? Round results to an appropriate number of significant digits.
- 37) A force of 689 lb is required to pull a boat up a ramp inclined at 16.0° with the horizontal. How much does the boat weigh?
- 38) What is the minimum force required to prevent a ball weighing 19.2 lb from rolling down a ramp which is inclined 22.6° with the horizontal?
- 39) A pilot wants to fly on a bearing of 66° . By flying due east, he finds that a 56-mph wind, blowing from the south, puts him on course. Find the airspeed of the plane.

6.2 Find the absolute value of the complex number. Round your answer to two decimal places, if necessary.

40) $-3 + 5i$

41) -7

Write the complex number in trigonometric form, using degree measure for the argument.

42) $-3i$

43) $6 + 8i$

Write the complex number in the form $a + bi$.

44) $\sqrt{6}(\cos 315^\circ + i \sin 315^\circ)$

45) $3 \left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right)$

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

46) $4(\cos 135^\circ + i \sin 135^\circ) \cdot 6(\cos 225^\circ + i \sin 225^\circ)$

47) $\frac{5(\cos 200^\circ + i \sin 200^\circ)}{4(\cos 50^\circ + i \sin 50^\circ)}$

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

48) $(2(\cos 45^\circ + i \sin 45^\circ))^3$

49) $(1 + i)^{20}$

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

50) Cube roots of $125(\cos 312^\circ + i \sin 312^\circ)$

51) Fourth roots of $16(\cos 260^\circ + i \sin 260^\circ)$

Solve the equation. Write the answer in $a + bi$ form.

52) $x^3 + 8i = 0$

Solve the equation. Express your answer in trigonometric form.

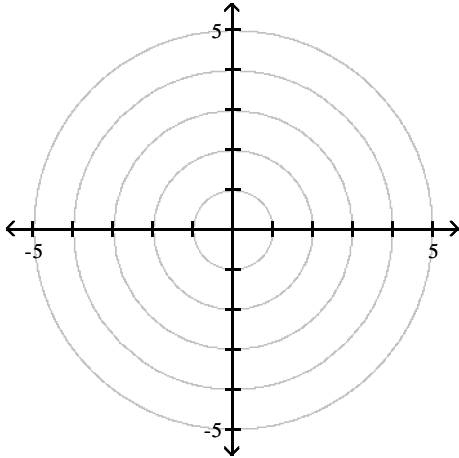
53) $x^5 - 6 = 0$

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

54) $(8, -8)$

Plot the point whose polar coordinates are given.

55) $(-2, -5\pi/4)$



Convert to rectangular coordinates.

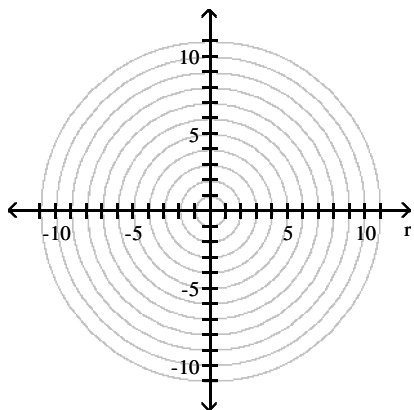
56) $\left(-4, -\frac{\pi}{3}\right)$

For the point given in rectangular coordinates, find equivalent polar coordinates (r, θ) for $r > 0$ and $0^\circ \leq \theta < 360^\circ$.

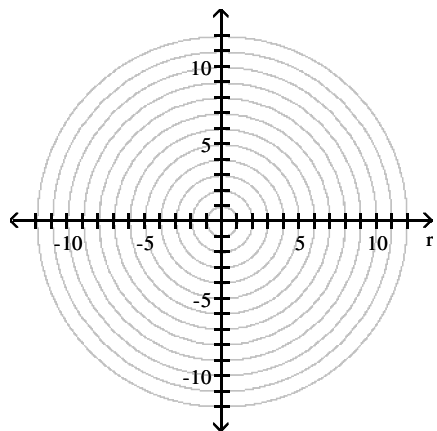
57) $(-6, -6)$

Graph the polar equation.

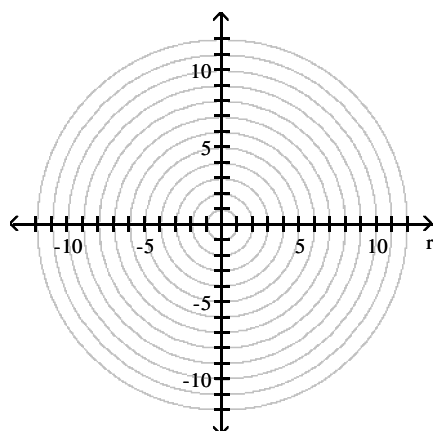
58) $r = 5 + 5 \sin \theta$



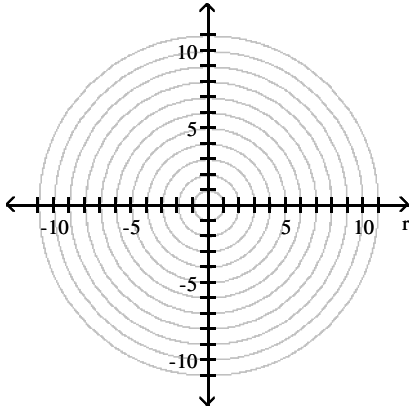
59) $r = 2(1 + 3 \sin \theta)$



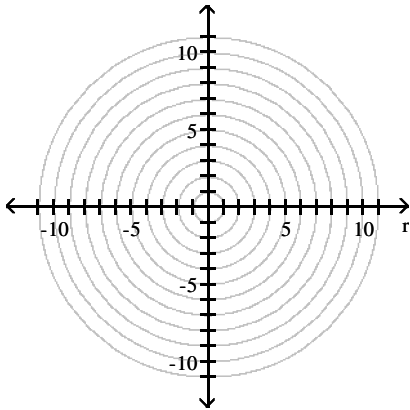
60) $r = 4 - \cos \theta$



61) $r = 5 \sin 3\theta$



62) $r^2 = 22 \cos 3\theta$



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

63) $r = 10 \sin \theta$

64) $r = 1 + 2 \sin \theta$

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

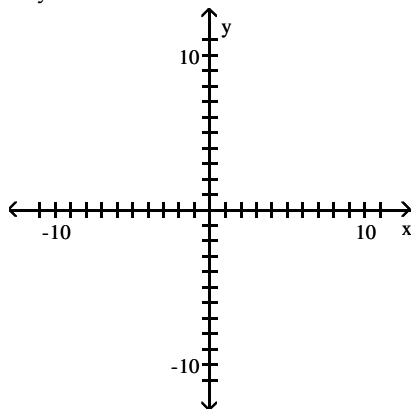
65) $y = x$

66) $x^2 - y^2 = 4$

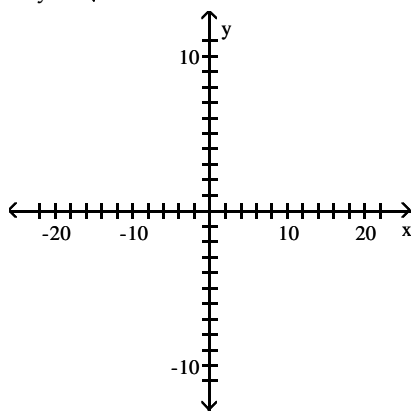
67) $xy = 1$

6.5 Graph the pair of parametric equations in the rectangular coordinate system.

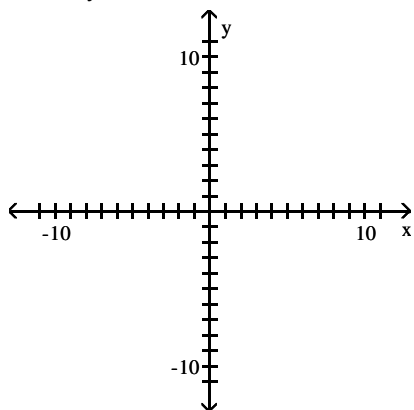
68) $x = 2t, y = t + 5; -2 \leq t \leq 3$



69) $x = t^2, y = \sqrt{t} + 5; 0 \leq t \leq 4$



70) $x = 3 \tan t, y = 5 \sec t; 0 \leq t \leq 2\pi$



Eliminate the parameter of the pair of parametric equations.

71) $x = t + 4, y = t^2$

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

72) The line segment starting at $(-4, 4)$ with $t = 0$ and ending at $(-13, -11)$ with $t = 3$

Solve the problem.

73) A projectile is fired with an initial velocity of 600 feet per second at an angle of 45° with the horizontal. In how many seconds will the projectile strike the ground? (Round your answer to the nearest tenth of a second.) The parametric equations for the path of the projectile are

$$x = (600 \cos 45^\circ)t, \text{ and}$$

$$y = (600 \sin 45^\circ)t - 16t^2.$$

Answer Key

Testname: 1060 CH 5 AND 6 REVIEW

- 1) $\gamma = 103^\circ$, $a = 11.7$, $b = 20.7$
- 2) $\beta = 50^\circ$, $a = 13.1$, $c = 21.4$
- 3) 0
- 4) 2
- 5) 1
- 6) $\alpha = 30.0^\circ$, $\gamma = 122.5^\circ$, $c = 27.9$;
 $\alpha' = 150.0^\circ$, $\gamma' = 2.5^\circ$, $c' = 1.43$
- 7) 33 ft
- 8) S23.6°W
- 9) $b = 11.2$, $\alpha = 77.6^\circ$, $\gamma = 38.9^\circ$
- 10) $\alpha = 23.4^\circ$, $\beta = 55.6^\circ$, $\gamma = 101.0^\circ$
- 11) 1
- 12) 0
- 13) 177 km
- 14) 12.5 mi
- 15) 722.1
- 16) 12.51 ft²
- 17) 962
- 18) 8.18
- 19)
- 20)
- 21) $|\mathbf{v}_x| = -38.9$, $|\mathbf{v}_y| = 100.4$
- 22) 13; 157.4°
- 23) $\langle 57, -90.2 \rangle$
- 24) $\langle -5, -9 \rangle$
- 25) $\langle -13, -9 \rangle$
- 26) $\langle 20, 60 \rangle$
- 27) $\langle -6, 0 \rangle$
- 28) -115
- 29) 130.7°
- 30) perpendicular
- 31) parallel
- 32) $6\mathbf{i} - 6\mathbf{j}$
- 33) $5\sqrt{5}$; 243.4°
- 34) $10\sqrt{2}$
- 35) 157 N, 12°
- 36) 94°, 399 mph
- 37) 2500 lb
- 38) 7.4 lb
- 39) 126 mph
- 40) 5.83
- 41) 7

Answer Key

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42) $3(\cos 270^\circ + i \sin 270^\circ)$

43) $10(\cos 53.1^\circ + i \sin 53.1^\circ)$

44) $\sqrt{3} - \sqrt{3}i$

45) $\frac{3}{2} + \frac{3\sqrt{3}}{2}i$

46) 24

47) $-\frac{5\sqrt{3}}{8} + \frac{5}{8}i$

48) $-5.657 + 5.657i$

49) -1024

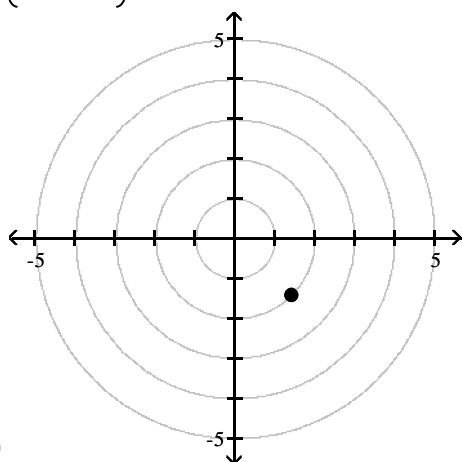
50) $5(\cos 104^\circ + i \sin 104^\circ)$, $5(\cos 224^\circ + i \sin 224^\circ)$, $5(\cos 344^\circ + i \sin 344^\circ)$

51) $2(\cos 65^\circ + i \sin 65^\circ)$, $2(\cos 155^\circ + i \sin 155^\circ)$, $2(\cos 245^\circ + i \sin 245^\circ)$, $2(\cos 335^\circ + i \sin 335^\circ)$

52) $2i$, $-\sqrt{3} - i$, $\sqrt{3} - i$

53) $6^{1/5}(\cos \alpha + i \sin \alpha)$ for $\alpha = 0^\circ, 72^\circ, 144^\circ, 216^\circ, 288^\circ$

54) $\left(8\sqrt{2}, \frac{7\pi}{4}\right)$

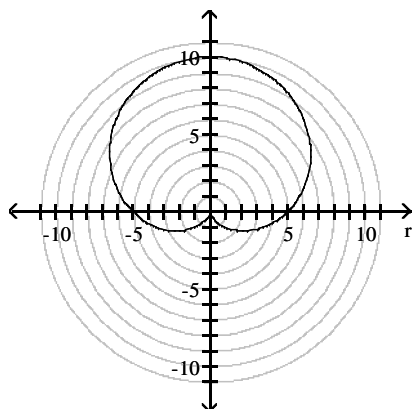


55)

56) $(-2, 2\sqrt{3})$

57) $(6\sqrt{2}, 225^\circ)$

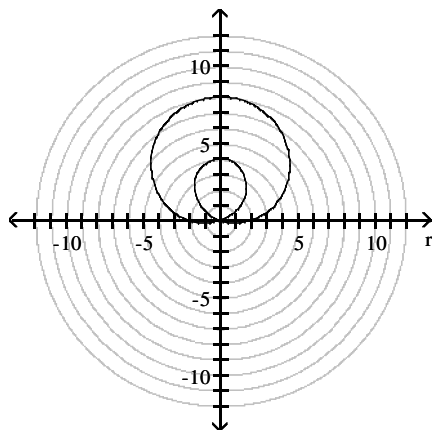
58)



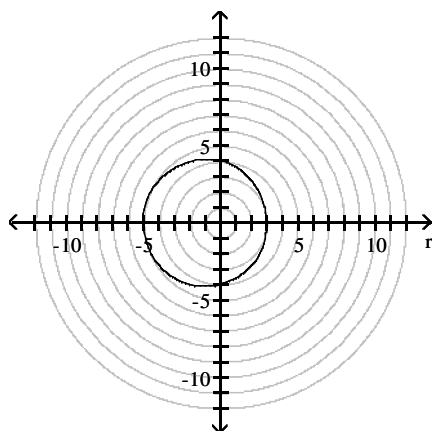
Answer Key

Testname: 1060 CH 5 AND 6 REVIEW

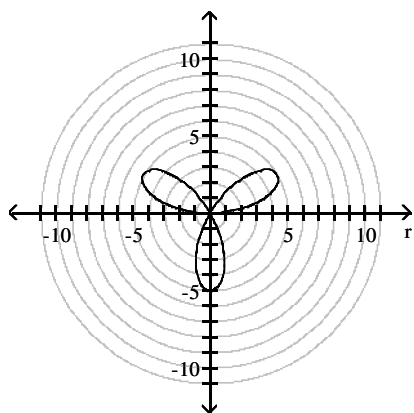
59)



60)



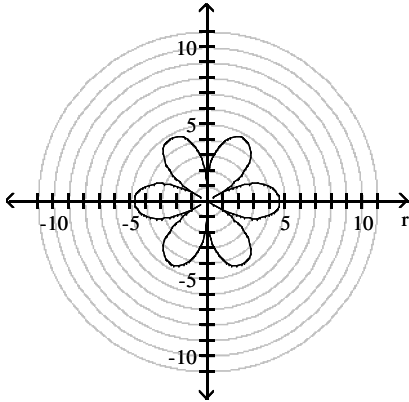
61)



Answer Key

Testname: 1060 CH 5 AND 6 REVIEW

62)



63) $x^2 + y^2 = 10y$

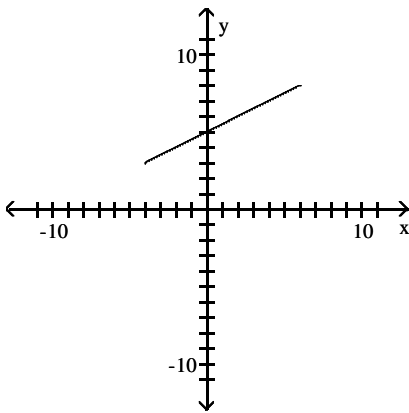
64) $x^2 + y^2 = \sqrt{x^2 + y^2} + 2y$

65) $\sin \theta = \cos \theta$

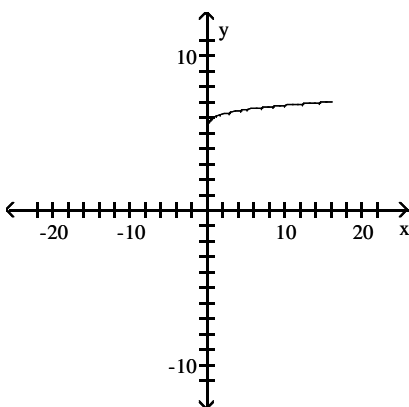
66) $r^2 \cos 2\theta = 4$

67) $r^2 \sin 2\theta = 2$

68)



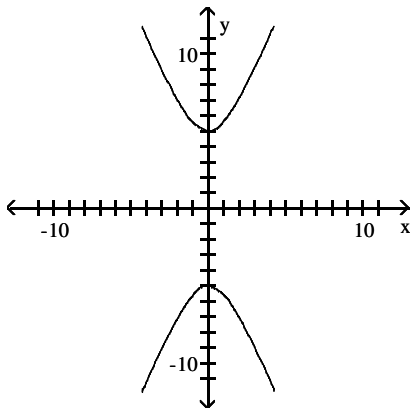
69)



Answer Key

Testname: 1060 CH 5 AND 6 REVIEW

70)



71) $y = x^2 - 8x + 16$

72) $x = -3t - 4$, $y = -5t + 4$, for $0 \leq t \leq 3$

73) 26.5 seconds