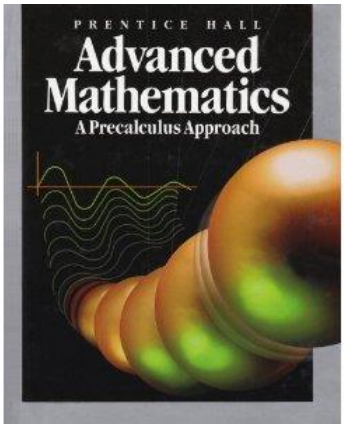
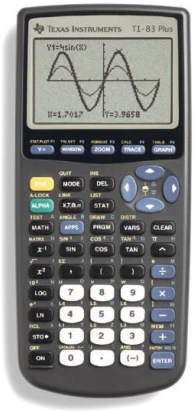


Pre-Calc Honors & Intro to Calculus BC Honors Final Exam REVIEW June, 2014



Name: _____ **Date:** _____

Teacher: _____ **Period:** _____

Your 120-point midterm examination will consist of 60 multiple-choice questions worth a total of 120 points – these will be completed on the Scantron.

The exam will cover the following topics: Trigonometry (2nd half), Polar & Complex Number, Vectors, Parametric Equations, and Conics.

You may use your calculator throughout the entire exam. Before the examination, clear your calculator of any formulas, notes or any such items, which could be perceived as "useful" or providing unfair advantage. The best solution is to RESET and clear the memory completely. The memory will be checked prior to the exam. If you forget your calculator on the day of the exam, your teacher will not provide you with a replacement for the exam.

NOTE: School policy mandates a penalty for cheating on an exam to be a grade of ZERO for that exam. The term cheating includes "intent to cheat." NO CELL PHONES. All cell phones must be kept out of sight. If a cell phone is seen during an exam, you will receive a grade of ZERO.

All calculators may be checked for inclusion of extraneous material. No papers should be placed in calculators. No information should be written on the front/back of calculators. The program portion of the graphing calculator will be checked. Any information entered there can be considered intent of cheating.

The following pages provide a review of the material which should be studied for this exam. Understand that just because a problem is not represented in this review package does NOT mean it cannot be asked on the exam. Please study your notes, homework, warm-ups, and assessments as well as this packet.

We will take some class time to review for this exam. Please feel free to stop in on your own time for further assistance. Good Luck!

Mr. Wieboldt & Ms. Eisen

PreCalc Honors & Intro to Calc BC Honors Name_____

Final Exam Review 2014

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find another representation, (r, θ), for the point under the given conditions.

1) $\left(3, \frac{\pi}{3}\right)$, $r > 0$ and $-2\pi < \theta < 0$

A) $\left(3, \frac{7}{3}\pi\right)$ B) $\left(3, -\frac{2}{3}\pi\right)$ C) $\left(3, -\frac{5}{3}\pi\right)$ D) $\left(3, \frac{4}{3}\pi\right)$

Select the representation that does not change the location of the given point.

2) $(-7, 6\pi)$

A) $(-7, 5\pi)$ B) $(7, 4\pi)$ C) $(-7, 7\pi)$ D) $(7, 5\pi)$

Polar coordinates of a point are given. Find the rectangular coordinates of the point.

3) $(-3, 120°)$

A) $\left(\frac{3}{2}, \frac{-3\sqrt{3}}{2}\right)$ B) $\left(-\frac{3}{2}, \frac{-3\sqrt{3}}{2}\right)$ C) $\left(-\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$ D) $\left(\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$

The rectangular coordinates of a point are given. Find polar coordinates of the point. Express θ in radians.

4) $(4, -4\sqrt{3})$

A) $\left(4, \frac{11\pi}{6}\right)$ B) $\left(4, \frac{5\pi}{3}\right)$ C) $\left(8, \frac{11\pi}{6}\right)$ D) $\left(8, \frac{5\pi}{3}\right)$

Convert the rectangular equation to a polar equation that expresses r in terms of θ.

5) $8x - 3y + 10 = 0$

A) $8\cos\theta - 3\sin\theta = 10$ B) $8\cos\theta - 3\sin\theta = -10$

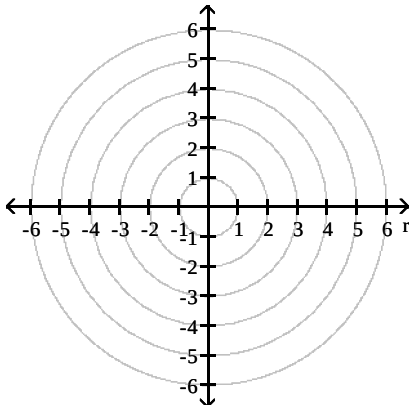
C) $r = \frac{-10}{(8\cos\theta - 3\sin\theta)}$ D) $r = \frac{-10}{(8\sin\theta - 3\cos\theta)}$

6) $(x - 16)^2 + y^2 = 256$

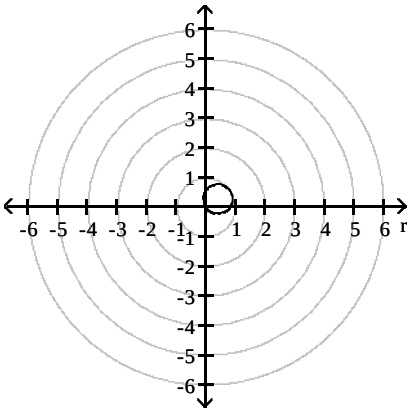
A) $r^2 = 32\cos\theta$ B) $r = 32\cos\theta$ C) $r = -32\sin\theta + 256$ D) $r = 32\sin\theta$

Graph the polar equation.

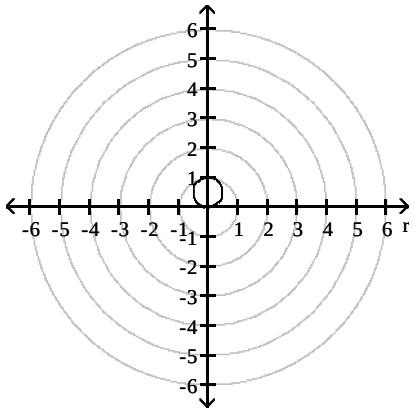
7) $r = 1 + \sin\theta$



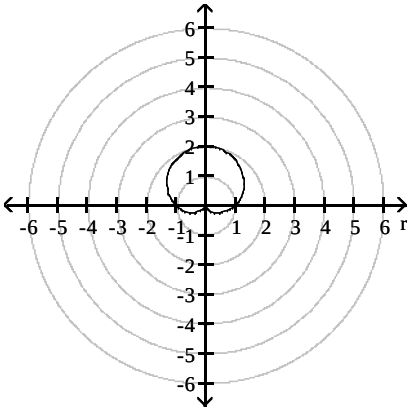
A)



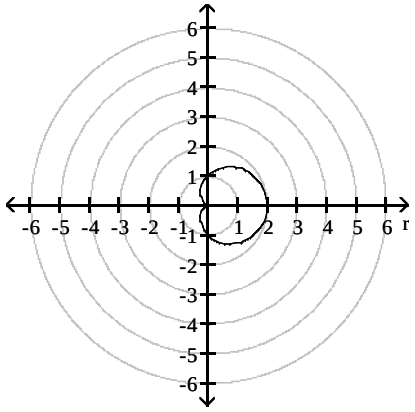
B)



C)



D)



Convert the polar equation to a rectangular equation.

8) $r = -3 \cos \theta$

A) $x = -3$ B) $\left(x - \frac{3}{2}\right)^2 + y^2 = 9$ C) $\left(x + \frac{3}{2}\right)^2 + y^2 = \frac{9}{4}$ D) $x^2 + y^2 = 3$

9) $r = 4 \csc \theta$

A) $y = 4$ B) $x^2 + y^2 = 4$ C) $y^2 = 4$ D) $x = 4$

Test the equation for symmetry with respect to the given axis, line, or pole.

10) $r = 2 \sin \theta$; the pole

A) has symmetry about the pole B) may or may not have symmetry about the pole

11) $r = 3 + 3 \cos \theta$; polar axis

A) has symmetry with respect to the polar axis

B) may or may not have symmetry with respect to the polar axis

Write the complex number in polar form. Express the argument in degrees.

12) $4i$

A) $4(\cos 270° + i \sin 270°)$ B) $4(\cos 180° + i \sin 180°)$

C) $4(\cos 90° + i \sin 90°)$ D) $4(\cos 0° + i \sin 0°)$

Write the complex number in polar form. Express the argument in radians.

13) $-5\sqrt{3} - 5i$

A) $10\left(\cos\frac{7\pi}{6} + i\sin\frac{7\pi}{6}\right)$

B) $10\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

C) $5\sqrt{3}\left(\cos\frac{13\pi}{6} + i\sin\frac{13\pi}{6}\right)$

D) $5\sqrt{3}\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

Solve the equation in the complex number system.

14) $x^5 - 1 = 0$

A) 1, cos(36°) + i sin(36°), cos(108°) + i sin(108°), cos(180°)+ i sin(180°), cos(252°) + i sin(252°)

B) –1, cos(72°)+ i sin(72°), cos(144°) + i sin(144°), cos(216°) + i sin(216°), cos(288°) + i sin(288°)

C) 1, cos(72°)+ i sin(72°), cos(144°) + i sin(144°), cos(216°) + i sin(216°), cos(288°) + i sin(288°)

D) 1, cos(72°) + i sin(72°), cos(144°) + i sin(144°), cos(216°) + i sin(216°),–1

Find all the complex roots. Write the answer in the indicated form.

15) The complex square roots of 25(cos 210° + i sin 210°) (polar form)

A) 5(cos 210° + i sin 210°), 5(cos 195° + i sin 195°)

B) 5(cos 210° + i sin 210°), –5(cos 195° + i sin 195°)

C) 5(cos 105° + i sin 105°), 195(cos 285° + i sin 285°)

D) 5(cos 105° + i sin 105°), 5(cos 285° + i sin 285°)

16) The complex cube roots of 8 (rectangular form)

A) $2, -1 + \sqrt{3}i, -1 - \sqrt{3}i$

B) $2, -1 - \sqrt{3}i, 1 - \sqrt{3}i$

C) $2, 1 + \sqrt{3}i, -1 - \sqrt{3}i$

D) $2, 1 + \sqrt{3}i, 1 - \sqrt{3}i$

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

17) $(\cos 30° + i \sin 30°)^{12}$

A) –i B) 1 C) –1 D) i

18) $(1 - i)^{10}$

A) –32i B) –32 + 32i C) 32 D) 32 – 32i

Find the quotient $\frac{z_1}{z_2}$ of the complex numbers. Leave answer in polar form.

19) $z_1 = \frac{1}{8}\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$

$z_2 = \frac{1}{3}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

A) $\frac{8}{3}\left(\cos -\frac{5\pi}{12} + i\sin -\frac{5\pi}{12}\right)$

B) $\frac{3}{8}\left(\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right)$

C) $\frac{3}{8}\left(\cos\frac{8}{3} + i\sin\frac{8}{3}\right)$

D) $\frac{1}{24}\left(\cos\frac{11\pi}{12} + i\sin\frac{11\pi}{12}\right)$

Find the product of the complex numbers. Leave answer in polar form.

20) $z_1 = 5(\cos 20° + i \sin 20°)$

$z_2 = 4(\cos 10° + i \sin 10°)$

A) 9(cos 30° + i sin 30°)

B) 9(–cos 200° – i sin 200°)

C) 20(cos 200° + i sin 200°)

D) 20(cos 30° + i sin 30°)

Parametric equations and a value for the parameter t are given. Find the coordinates of the point on the plane curve described by the parametric equations corresponding to the given value of t.

21) $x = t^3 + 1$, $y = 9 - t^4$; $t = 2$

A) (9, –7) B) (17, –15) C) (9, 25) D) (17, 1)

Eliminate the parameter t. Find a rectangular equation for the plane curve defined by the parametric equations.

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

A) $\frac{y^2}{25} + \frac{x^2}{9} = 1$; $-\infty < x < \infty$

B) $y = x^2 - 9$; $-3 \le x \le 3$

C) $\frac{y^2}{25} - \frac{x^2}{9} = 1$; $-\infty < x < \infty$

D) $y = 5\sqrt{1 + \frac{x^2}{9}}$; $-\infty < x < \infty$

23) $x = \sqrt{t}$, $y = 3t + 4$; $0 \le t \le 4$

A) $y = -4x^2 + 18$; $0 \le x \le 2$

B) $y = 4x^2 + 3$; $-1 \le x \le 2$

C) $y = -4x + 18$; $0 \le x \le 2$

D) $y = 3x^2 + 4$; $0 \le x \le 2$

24) $x = 2 + \sec t$, $y = 5 + 2 \tan t$; $0 < t < \frac{\pi}{2}$

A) $(y - 2)^2 - \frac{(x - 5)^2}{4} = 1$; $-\infty < x < \infty$

B) $(x - 2)^2 + \frac{(y - 5)^2}{4} = 1$; $1 \le x \le 3$

C) $(x - 2)^2 - \frac{(y - 5)^2}{4} = 1$; $x > 3$

D) $(x - 2)^2 - (y - 5)^2 = 4$; $-\infty < x < \infty$

Find a set of parametric equations for the conic section or the line.

25) Circle: Center: (2, 3); Radius: 2

A) $x = 2 + 2 \cos t$; $y = 3 + 2 \sin t$

B) $x = t - 2$; $(y - 3)^2 + t^2 = 4$

C) $x = 2 + \sin t$; $y = 3 + \cos t$

D) $x = 3 + 2 \sin t$; $y = 2 + 2 \cos t$

26) Ellipse: Center: (–4, –5); Vertices: 5 units above and below the center; Endpoints of Minor Axis: 2 units left and right of the center.

A) $x = -4 - 2 \cos t$, $y = -5 - 5 \sin t$

B) $x = 2 - 4 \cos t$, $y = 5 - 5 \sin t$

C) $x = -4 + 2 \cos t$, $y = -5 + 5 \sin t$

D) $x = -4 + 5 \cos t$, $y = -5 + 2 \sin t$

27) The line segment starting at (5, 4) with $t = 0$ and ending at (–7, –12) with $t = 4$

A) $x = -4t + 4$, $y = -3t + 5$, for $0 \le t \le 4$

B) $x = -3t + 5$, $y = -4t + 4$, for $0 \le t \le 4$

C) $x = 4t - 4$, $y = 5t - 3$, for $0 \le t \le 4$

D) $x = 5t - 3$, $y = 4t - 4$, for $0 \le t \le 4$

Find a set of parametric equations for the rectangular equation.

28) $y = x^4 + 5$

A) $x = t^2$; $y = t^2 + 5$

B) $x = t$; $y = t^4 + 5$

C) $x = t^2$; $y = t^4 + 5$

D) $x = t$; $y = t^2 + 5$

Find two sets of parametric equations for the given rectangular equation.

29) $y = x^2 - 2$

A) $x = -t$, $y = t^2 + 2$; $x = \sqrt{t}$, $y = t - 2$

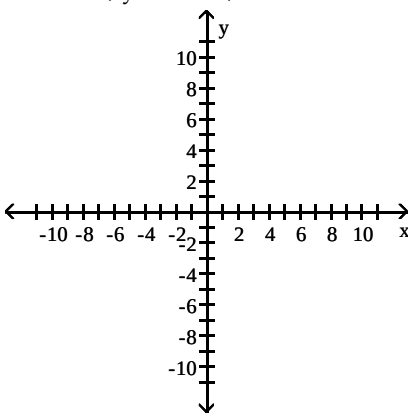
B) $x = t$, $y = t^2 - 2$; $x = \sqrt{t}$, $y = t + 2$, $t \ge 0$

C) $x = -t$, $y = t^2 - 2$; $x = \sqrt{t}$, $y = -t + 2$, $t \ge 0$

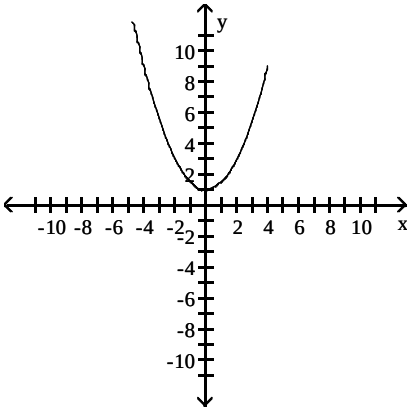
D) $x = t$, $y = t^2 - 2$; $x = \sqrt{t}$, $y = t - 2$, $t \ge 0$

Use point plotting to graph the plane curve described by the given parametric equations.

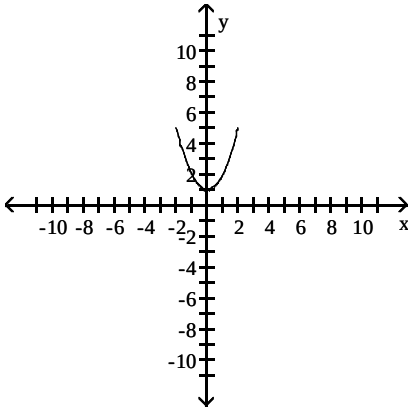
30) $x = 2t - 1$, $y = t^2 + 5$; $-4 \le t \le 4$



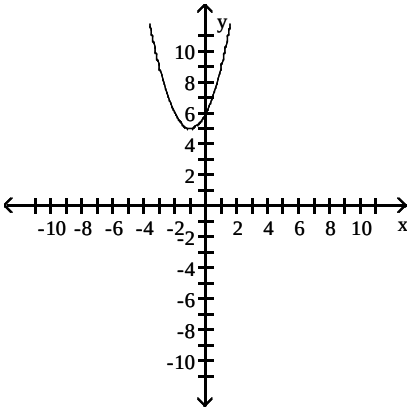
A)



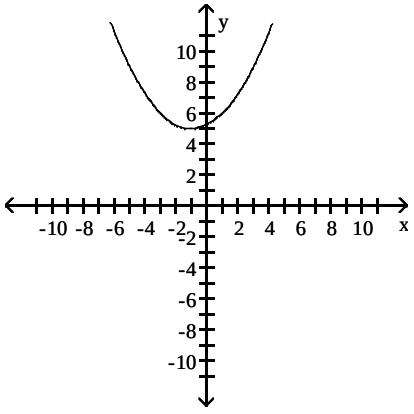
B)



C)



D)



Let v be the vector from initial point P_1 to terminal point P_2. Write v in terms of i and j.

31) $P_1 = (5, 1)$; $P_2 = (-3, -5)$

A) $\mathbf{v} = -6\mathbf{i} - 8\mathbf{j}$ B) $\mathbf{v} = -8\mathbf{i} - 6\mathbf{j}$ C) $\mathbf{v} = 8\mathbf{i} + 6\mathbf{j}$ D) $\mathbf{v} = 6\mathbf{i} + 8\mathbf{j}$

Find the specified vector or scalar.

32) $\mathbf{u} = -12\mathbf{i} - 2\mathbf{j}$, $\mathbf{v} = 6\mathbf{i} + 7\mathbf{j}$; Find $\mathbf{u} - \mathbf{v}$.

A) $-6\mathbf{i} + 5\mathbf{j}$ B) $-18\mathbf{i} - 9\mathbf{j}$ C) $-20\mathbf{i} + 5\mathbf{j}$ D) $-19\mathbf{i} + 5\mathbf{j}$

33) $\mathbf{u} = -4\mathbf{i} + 1\mathbf{j}$ and $\mathbf{v} = 4\mathbf{i} + 1\mathbf{j}$; Find $\|\mathbf{u} + \mathbf{v}\|$.

A) 5 B) $\sqrt{34}$ C) 2 D) 8

Find the unit vector that has the same direction as the vector v.

34) $\mathbf{v} = 3\mathbf{i} + \mathbf{j}$

A) $\mathbf{u} = \frac{3}{\sqrt{11}}\mathbf{i} + \frac{1}{\sqrt{11}}\mathbf{j}$ B) $\mathbf{u} = \frac{\sqrt{10}}{3}\mathbf{i} + \sqrt{10}\mathbf{j}$ C) $\mathbf{u} = 3\sqrt{10}\mathbf{i} + \sqrt{10}\mathbf{j}$ D) $\mathbf{u} = \frac{3}{\sqrt{10}}\mathbf{i} + \frac{1}{\sqrt{10}}\mathbf{j}$

Perform the indicated operation.

35) $\mathbf{u} = 3\mathbf{i} + \mathbf{j}$, $\mathbf{v} = -10\mathbf{i} - 9\mathbf{j}$, $\mathbf{w} = \mathbf{i} - 7\mathbf{j}$; Find $\mathbf{v} - (\mathbf{u} - \mathbf{w})$.

A) $-6\mathbf{i} - 15\mathbf{j}$ B) $-12\mathbf{i} + 17\mathbf{j}$ C) $-12\mathbf{i} - 17\mathbf{j}$ D) $-14\mathbf{i} - 3\mathbf{j}$

Use the given vectors to find the specified scalar.

36) $\mathbf{u} = -13\mathbf{i} - 6\mathbf{j}$ and $\mathbf{v} = -13\mathbf{i} + 7\mathbf{j}$; Find $\mathbf{u} \cdot \mathbf{v}$.

A) 127 B) 169 C) 211 D) −42

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

37) $\mathbf{u} = -2\mathbf{i} + 5\mathbf{j}$, $\mathbf{v} = 4\mathbf{i} - 6\mathbf{j}$

A) 74.1° B) 168.1° C) 84.1° D) 178.1°

Use the dot product to determine whether the vectors are parallel, orthogonal, or neither.

38) $\mathbf{v} = 2\mathbf{i} + \mathbf{j}$, $\mathbf{w} = \mathbf{i} - 2\mathbf{j}$

A) parallel B) orthogonal C) neither

39) $\mathbf{v} = 3\mathbf{i} - \mathbf{j}$, $\mathbf{w} = 6\mathbf{i} - 2\mathbf{j}$

A) orthogonal B) parallel C) neither

Solve the problem.

40) Let vector $\mathbf{u}$ have initial point $P_1 = (0, 2)$ and terminal point $P_2 = (4, 0)$. Let vector $\mathbf{v}$ have initial point $Q_1 = (3, 0)$ and terminal point $Q_2 = (7, -2)$. $\mathbf{u}$ and $\mathbf{v}$ have the same direction. Find $\|\mathbf{u}\|$ and $\|\mathbf{v}\|$. Is $\mathbf{u} = \mathbf{v}$?

A) $\|\mathbf{u}\| = \sqrt{6}, \|\mathbf{v}\| = \sqrt{6}$; yes B) $\|\mathbf{u}\| = 6, \|\mathbf{v}\| = 6$; no

C) $\|\mathbf{u}\| = 2\sqrt{5}, \|\mathbf{v}\| = 2\sqrt{5}$; yes D) $\|\mathbf{u}\| = 2\sqrt{5}, \|\mathbf{v}\| = 2\sqrt{5}$; no

Write the vector v in terms of i and j whose magnitude $\|\mathbf{v}\|$ and direction angle θ are given.

41) $\|\mathbf{v}\| = 7$, $\theta = 225°$

A) $\mathbf{v} = -\frac{7\sqrt{2}}{2}\mathbf{i} - \frac{7\sqrt{2}}{2}\mathbf{j}$ B) $\mathbf{v} = -\frac{7}{2}\mathbf{i} - \frac{7\sqrt{3}}{2}\mathbf{j}$

C) $\mathbf{v} = -\frac{7\sqrt{3}}{2}\mathbf{i} - \frac{7}{2}\mathbf{j}$ D) $\mathbf{v} = \frac{7\sqrt{2}}{2}\mathbf{i} + \frac{7\sqrt{2}}{2}\mathbf{j}$

Find the exact value by using a sum or difference identity.

42) sin 165°

A) $\frac{\sqrt{2}(\sqrt{3} - 1)}{4}$ B) $-\frac{\sqrt{2}(\sqrt{3} + 1)}{4}$ C) $-\frac{\sqrt{2}(\sqrt{3} - 1)}{4}$ D) $\frac{\sqrt{2}(\sqrt{3} + 1)}{4}$

Find the exact value of the expression.

43) $\sin 25° \cos 35° + \cos 25° \sin 35°$

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{\sqrt{3}}{3}$ D) $\frac{5}{12}$

Use the given information to find the exact value of the expression.

44) $\sin \alpha = \frac{21}{29}$, α lies in quadrant II, and $\cos \beta = \frac{15}{17}$, β lies in quadrant I Find $\sin(\alpha - \beta)$.

A) $\frac{468}{493}$ B) $\frac{475}{493}$ C) $\frac{132}{493}$ D) $\frac{155}{493}$

Use a sketch to find the exact value of the expression.

45) $\cos\left(\tan^{-1}\frac{2}{3}\right)$

A) $\frac{3\sqrt{13}}{13}$ B) $\frac{\sqrt{13}}{3}$ C) $\frac{2}{3}$ D) $\frac{3}{13}$

Use a right triangle to write the expression as an algebraic expression. Assume that x is positive and in the domain of the given inverse trigonometric function.

46) $\cos(\tan^{-1} x)$

A) $\frac{\sqrt{x^2+1}}{x^2+1}$ B) $x\sqrt{x^2+1}$ C) $\frac{\sqrt{x^2-1}}{x^2-1}$ D) $\frac{x\sqrt{x^2+1}}{x^2+1}$

Solve the equation on the interval $[0, 2\pi)$.

47) $\cos^2 x + 2\cos x + 1 = 0$

A) 2π B) π C) $\frac{\pi}{2}, \frac{3\pi}{2}$ D) $\frac{\pi}{4}, \frac{7\pi}{4}$

48) $\cos 2x = \frac{\sqrt{2}}{2}$

A) $\frac{\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{15\pi}{8}$ B) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ C) $0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}$ D) no solution

Use a calculator to solve the equation on the interval $[0, 2\pi)$. Round to the nearest hundredth of a radian.

49) $\sin 3x = \sin x$

A) 1.57, 4.71 B) 0, 0.79, 2.36, 3.14, 3.93, 5.50
C) 0, 1.57, 3.14, 4.71 D) 0.79, 1.57, 2.36, 3.93, 4.71, 5.50

Solve the triangle. Round lengths to the nearest tenth and angle measures to the nearest degree.

50) $A = 38°$
$B = 32°$
$a = 42.1$

A) $C = 111°$, $b = 36.2$, $c = 64.3$ B) $C = 110°$, $b = 64.3$, $c = 36.2$
C) $C = 111°$, $b = 64.3$, $c = 36.2$ D) $C = 110°$, $b = 36.2$, $c = 64.3$

51) $a = 5$, $b = 8$, $C = 120°$

A) $c = 17.2$, $A = 20°$, $B = 40°$ B) $c = 14.3$, $A = 24°$, $B = 36°$
C) $c = 11.4$, $A = 22°$, $B = 38°$ D) no triangle

52) $a = 9$, $b = 6$, $c = 4$

A) $A = 32°$, $B = 21°$, $C = 127°$ B) $A = 127°$, $B = 21°$, $C = 32°$
C) $A = 127°$, $B = 32°$, $C = 21°$ D) $A = 32°$, $B = 127°$, $C = 21°$

Two sides and an angle (SSA) of a triangle are given. Determine whether the given measurements produce one triangle, two triangles, or no triangle at all. Solve each triangle that results. Round lengths to the nearest tenth and angle measures to the nearest degree.

53) A = 30°, a = 22, b = 44

A) B = 90°, C = 60°, c = 38.1
B) no triangle
C) B = 60°, C = 90°, c = 38.1
D) B = 60°, C = 60°, c = 38.1

54) B = 88°, b = 2, a = 23

A) no triangle
B) A = 44°, C = 48°, c = 25
C) A = 45°, C = 48°, c = 29
D) A = 43°, C = 48°, c = 27

Find the area of the triangle having the given measurements. Round to the nearest square unit.

55) A = 37°, b = 10 inches, c = 9 inches

A) 27 square inches
B) 36 square inches
C) 38 square inches
D) 25 square inches

Use Heron's formula to find the area of the triangle. Round to the nearest square unit.

56) a = 10 yards, b = 11 yards, c = 15 yards

A) 61 square yards
B) 58 square yards
C) 55 square yards
D) 64 square yards

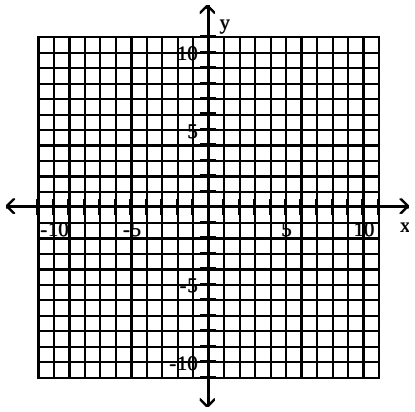
Solve the problem.

57) A surveyor standing 64 meters from the base of a building measures the angle to the top of the building and finds it to be 39°. The surveyor then measures the angle to the top of the radio tower on the building and finds that it is 48°. How tall is the radio tower?

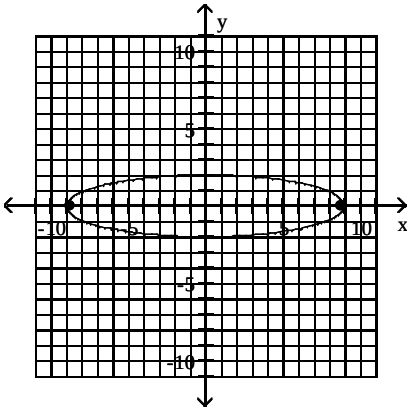
A) 7.28 meters
B) 19.25 meters
C) 6.91 meters
D) 10.14 meters

Graph the ellipse and locate the foci.

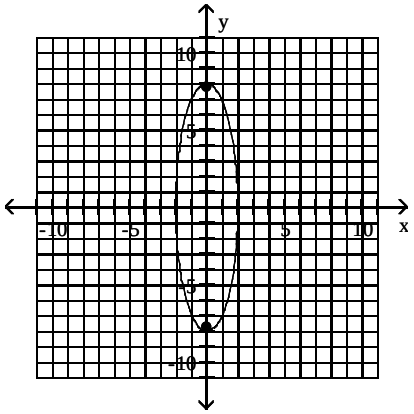
58) $\frac{x^2}{64} + \frac{y^2}{4} = 1$



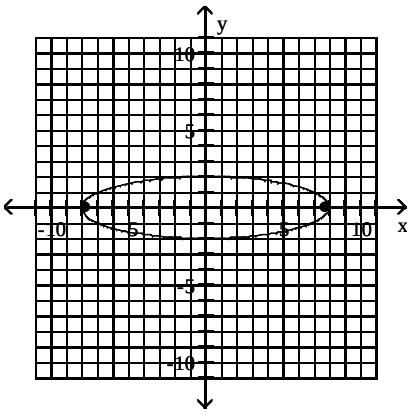
A) foci at $(\sqrt{77}, 0)$ and $(-\sqrt{77}, 0)$



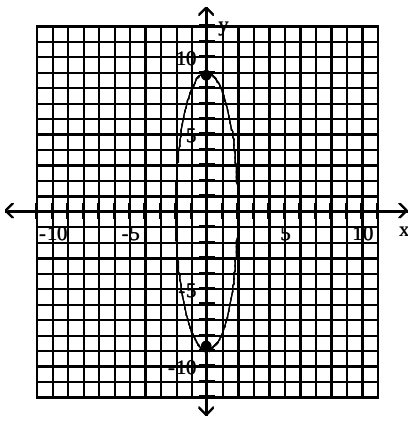
B) foci at $(0, 2\sqrt{15})$ and $(0, -2\sqrt{15})$



C) foci at $(2\sqrt{15}, 0)$ and $(-2\sqrt{15}, 0)$



D) foci at $(0, \sqrt{77})$ and $(0, -\sqrt{77})$



Find the standard form of the equation of the ellipse satisfying the given conditions.

59) Foci: (–5, 0), (5, 0); vertices: (–7, 0), (7, 0)

A) $\frac{x^2}{25} + \frac{y^2}{49} = 1$ B) $\frac{x^2}{25} + \frac{y^2}{24} = 1$ C) $\frac{x^2}{24} + \frac{y^2}{49} = 1$ D) $\frac{x^2}{49} + \frac{y^2}{24} = 1$

60) Major axis horizontal with length 10; length of minor axis = 4; center (0, 0)

A) $\frac{x^2}{10} + \frac{y^2}{4} = 1$ B) $\frac{x^2}{25} + \frac{y^2}{4} = 1$ C) $\frac{x^2}{4} + \frac{y^2}{25} = 1$ D) $\frac{x^2}{100} + \frac{y^2}{16} = 1$

Find the foci of the ellipse whose equation is given.

61) $\frac{(x+2)^2}{9} + \frac{(y-1)^2}{36} = 1$

A) foci at $(2, 1 - 3\sqrt{3})$ and $(2, 1 + 3\sqrt{3})$
B) foci at $(-1, 1 - 3\sqrt{3})$ and $(-1, 1 + 3\sqrt{3})$
C) foci at $(-2, 1 - 3\sqrt{3})$ and $(-2, 1 + 3\sqrt{3})$
D) foci at $(1, -2 - 3\sqrt{3})$ and $(1, -2 + 3\sqrt{3})$

Find the standard form of the equation of the ellipse satisfying the given conditions.

62) Major axis horizontal with length 8; length of minor axis = 6; center (0, 0)

A) $\frac{x^2}{8} + \frac{y^2}{9} = 1$ B) $\frac{x^2}{64} + \frac{y^2}{36} = 1$ C) $\frac{x^2}{9} + \frac{y^2}{16} = 1$ D) $\frac{x^2}{16} + \frac{y^2}{9} = 1$

Convert the equation to the standard form for an ellipse by completing the square on x and y.

63) $16x^2 + 25y^2 - 32x - 150y - 159 = 0$

A) $\frac{(x+1)^2}{25} + \frac{(y+3)^2}{16} = 1$

B) $\frac{(x-3)^2}{25} + \frac{(y-1)^2}{16} = 1$

C) $\frac{(x-1)^2}{16} + \frac{(y-3)^2}{25} = 1$

D) $\frac{(x-1)^2}{25} + \frac{(y-3)^2}{16} = 1$

Find the standard form of the equation of the hyperbola satisfying the given conditions.

64) Foci: (–8, 0), (8, 0); vertices: (–6, 0), (6, 0)

A) $\frac{y^2}{36} - \frac{x^2}{28} = 1$

B) $\frac{x^2}{36} - \frac{y^2}{64} = 1$

C) $\frac{x^2}{36} - \frac{y^2}{28} = 1$

D) $\frac{y^2}{36} - \frac{x^2}{64} = 1$

65) Endpoints of transverse axis: (0, –10), (0, 10); asymptote: $y = \frac{5}{8}x$

A) $\frac{y^2}{100} - \frac{x^2}{64} = 1$

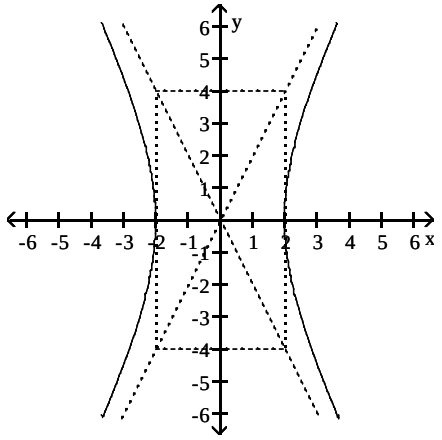
B) $\frac{y^2}{100} - \frac{x^2}{256} = 1$

C) $\frac{y^2}{64} - \frac{x^2}{25} = 1$

D) $\frac{y^2}{256} - \frac{x^2}{100} = 1$

Find the standard form of the equation of the hyperbola.

66)



A) $\frac{y^2}{4} - \frac{x^2}{16} = 1$

B) $\frac{y^2}{16} - \frac{x^2}{4} = 1$

C) $\frac{x^2}{16} - \frac{y^2}{4} = 1$

D) $\frac{x^2}{4} - \frac{y^2}{16} = 1$

Convert the equation to the standard form for a hyperbola by completing the square on x and y.

67) $x^2 - y^2 + 6x - 4y + 4 = 0$

A) $(y + 3)^2 - (x + 2)^2 = 1$

B) $(x + 3)^2 + (y + 2)^2 = 1$

C) $(x + 3)^2 - (y + 2)^2 = 1$

D) $\frac{(y+3)^2}{16} - \frac{(x+2)^2}{36} = 1$

Find the location of the center, vertices, and foci for the hyperbola described by the equation.

68) $\frac{(x+4)^2}{36} - \frac{(y-1)^2}{25} = 1$

A) Center: (–4, 1); Vertices: (–9, 1) and (3, 1); Foci: $(-3+\sqrt{61}, 2)$ and $(2+\sqrt{61}, 2)$

B) Center: (–4, 1); Vertices: (–10, 1) and (2, 1); Foci: $(-4-\sqrt{61}, 1)$ and $(-4+\sqrt{61}, 1)$

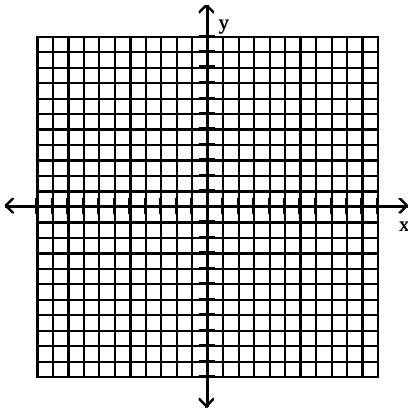
C) Center: (4, –1); Vertices: (–2, –1) and (10, –1); Foci: $(4-\sqrt{61}, -1)$ and $(4+\sqrt{61}, -1)$

D) Center: (–4, 1); Vertices: (–10, –1) and (2, –1); Foci: $(-4-\sqrt{61}, -1)$ and $(-4+\sqrt{61}, -1)$

Find the solution set for the system algebraically or by graphing both of the system's equations in the same rectangular coordinate system and finding points of intersection.

69) $9x^2 + y^2 = 9$

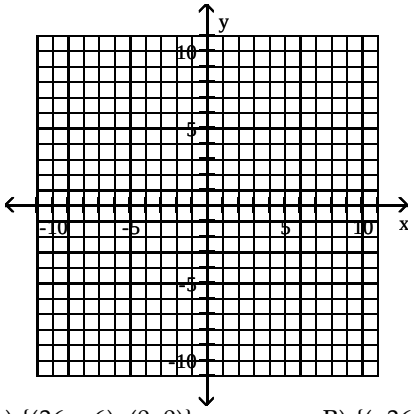
$y^2 - 9x^2 = 9$



A) {(0, 9)} B) {(3, 0), (3, 0)} C) {(0, –3)} D) {(0, –3), (0, 3)}

70) $(y-6)^2 = x + 36$

$y = -\frac{1}{6}x$



A) {(36, –6), (0, 0)} B) {(–36, 6), (0, 0)} C) {(–36, 0), (6, 0)} D) {(–36, 6)}

Find the standard form of the equation of the parabola using the information given.

71) Focus: (0, –4); Directrix: y = 4

A) $y^2 = -4x$ B) $x^2 = -16y$ C) $x^2 = 16y$ D) $y^2 = -16x$

Convert the equation to the standard form for a parabola by completing the square on x or y as appropriate.

72) $y^2 + 2y - 2x - 3 = 0$

A) $(y + 1)^2 = 2(x - 2)$ B) $(y - 1)^2 = 2(x + 2)$ C) $(y - 1)^2 = -2(x + 2)$ D) $(y + 1)^2 = 2(x + 2)$

Find the vertex, focus, and directrix of the parabola with the given equation.

73) $(y + 1)^2 = 20(x - 4)$

A) vertex: (–1, 4)
focus: (4, 4)
directrix: $x = -6$

B) vertex: (4, –1)
focus: (–1, –1)
directrix: $x = 9$

C) vertex: (4, –1)
focus: (9, –1)
directrix: $x = -1$

D) vertex: (–4, 1)
focus: (1, 1)
directrix: $x = -9$

Identify the equation without completing the square.

74) $4x^2 - 4x + y + 3 = 0$

A) parabola B) hyperbola C) circle D) ellipse

75) $3x^2 - 4y^2 + 2x + 2y + 1 = 0$

A) circle B) ellipse C) parabola D) hyperbola

Write the standard form of the equation of the circle with the given center and radius.

76) (0, –7); 9

A) $x^2 + (y - 7)^2 = 9$ B) $x^2 + (y + 7)^2 = 81$ C) $(x - 7)^2 + y^2 = 81$ D) $(x + 7)^2 + y^2 = 81$

Complete the square and write the equation in standard form. Then give the center and radius of the circle.

77) $x^2 - 2x + 1 + y^2 - 6y + 9 = 25$

A) $(x - 3)^2 + (y - 1)^2 = 25$
(–3, –1), r = 25

B) $(x - 1)^2 + (y - 3)^2 = 25$
(1, 3), r = 5

C) $(x - 3)^2 + (y - 1)^2 = 25$
(3, 1), r = 5

D) $(x - 1)^2 + (y - 3)^2 = 25$
(–1, –3), r = 25

INTRO TO CALC BC STUDENTS: **Identify the conic section that the polar equation represents. Describe the location of a directrix from the focus located at the pole.**

78) $r = \dfrac{2}{1 - 2\cos\theta}$

A) ellipse; The directrix is 1 unit(s) to the right of the pole at $x = 1$.
B) hyperbola; The directrix is 1 unit(s) to the left of the pole at $x = -1$.
C) ellipse; The directrix is 1 unit(s) to the left of the pole at $x = -1$.
D) hyperbola; The directrix is 1 unit(s) to the right of the pole at $x = 1$.

79) $r = \dfrac{4}{2 + 2\sin\theta}$

A) hyperbola; The directrix is 2 unit(s) above the pole at $y = 2$.
B) parabola; The directrix is 2 unit(s) to the right of the pole at $x = 2$.
C) hyperbola; The directrix is 2 unit(s) to the right of the pole at $x = 2$.
D) parabola; The directrix is 2 unit(s) above the pole at $y = 2$.

80) Find the vector $\boldsymbol{u} \times \boldsymbol{v}$ (cross product) when $\boldsymbol{u} = (2, 0, 3)$ and $\boldsymbol{v} = (-1, 7, -5)$.

A) (–21, 7, 14) B) (21, –7, –14) C) (–21, –7, 14) D) (21, 7, –14)

1) C
2) D
3) A
4) D
5) C
6) B
7) C
8) C
9) A
10) B
11) A
12) C
13) A
14) C
15) D
16) A
17) B
18) A
19) B
20) D
21) A
22) C
23) D
24) C
25) A
26) C
27) B
28) B
29) D
30) D
31) B
32) B
33) C
34) D
35) C
36) A
37) B
38) B
39) B
40) C
41) A
42) A
43) B
44) B
45) A
46) A
47) B
48) A
49) B
50) D
51) C
52) C
53) A
54) A
55) A
56) C
57) B
58) C
59) D
60) B
61) C
62) D
63) D
64) C
65) B
66) D
67) C
68) B
69) D
70) B
71) B
72) D
73) C
74) A
75) D
76) B
77) B
78) B
79) D
80) A