Name: _____ Class: _____ Date: _____ ID: A

Explorations 2nd Semester Study Guide

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

____ 1. What basic trigonometric identity would you use to verify that $\tan x \cos x = \sin x$?

a. $\cos x = \dfrac{1}{\sec x}$

b. $\sin x = \dfrac{1}{\csc x}$

c. $\cos^2 x + \sin^2 x = 1$

d. $\tan x = \dfrac{\sin x}{\cos x}$

____ 2. What basic trigonometric identity would you use to verify that $\cot x \sin x = \cos x$?

a. $\cos^2 x + \sin^2 x = 1$

b. $\cot x = \dfrac{\cos x}{\sin x}$

c. $\cos x = \dfrac{1}{\sec x}$

d. $\sin x = \dfrac{1}{\csc x}$

____ 3. What basic trigonometric identity would you use to verify that $\dfrac{\sin^2 x + \cos^2 x}{\cos x} = \sec x$?

a. $\sin x = \dfrac{1}{\csc x}$

b. $1 + \cot^2 x = \csc^2 x$

c. $\cos^2 x + \sin^2 x = 1$

d. $\cos x = \dfrac{1}{\sec x}$

____ 4. What basic trigonometric identity would you use to verify that $\dfrac{\sin x + 1}{\sin x} = 1 + \csc x$?

a. $\sin x = \cos x \tan x$

b. $\cos^2 x + \sin^2 x = 1$

c. $\csc x = \dfrac{1}{\sin x}$

d. $1 + \cot^2 x = \csc^2 x$

____ 5. What basic trigonometric identity would you use to verify that $\sin x \cos x \tan x = 1 - \cos^2 x$?

a. $\tan x = \dfrac{\sin x}{\cos x}$

b. $\cos^2 x + \sin^2 x = 1$

c. $\sin x = \cos x \tan x$

d. $1 + \tan^2 x = \sec^2 x$

____ 6. Find $\sec x$ if $\tan^2 x = \dfrac{1}{2}$.

a. $\pm\dfrac{1}{4}$ b. $\pm\dfrac{\sqrt{2}}{2}$ c. $\pm\dfrac{1}{2}$ d. $\pm\dfrac{\sqrt{6}}{2}$

____ 7. Find $\cos x$ if $\sin x \cot x = 4$.

a. 4 b. 2 c. 1 d. $\sqrt{2}$

____ 8. Find $\cos x$ if $\dfrac{\sin^2 x - 1}{\cos x} = -1$.

a. -1 b. 2 c. 1 d. 0

____ 9. Find the exact value of cos 15°.

a. $\frac{\sqrt{2}}{4}$ b. $\frac{\sqrt{2}+\sqrt{6}}{4}$ c. $\frac{\sqrt{2}}{2}$ d. $\frac{\sqrt{6}}{4}$

____ 10. Find the exact value of cos 105°.

a. $\frac{\sqrt{2}}{4}$ b. $-\frac{1}{2}$ c. $\frac{\sqrt{2}-\sqrt{6}}{4}$ d. $\frac{\sqrt{6}}{4}$

____ 11. If α and β are the measures of two first quadrant angles and $\sin\alpha=\frac{4}{5}$ and $\sin\beta=\frac{5}{13}$, find $\sin(\alpha+\beta)$.

a. $\frac{63}{65}$ b. $\frac{33}{65}$ c. $\frac{16}{65}$ d. $\frac{56}{65}$

____ 12. Which sum or difference identity would you use to verify that $\cos(180°-\theta)=-\cos\theta$?

a. $\sin(\alpha-\beta)=\sin\alpha\cos\beta-\cos\alpha\sin\beta$
b. $\cos(\alpha-\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$
c. $\cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta$
d. $\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta$

____ 13. If $\sin\theta=\frac{3}{5}$ and θ terminates in the first quadrant, find the exact value of $\cos 2\theta$.

a. $\frac{3}{5}$ b. $\frac{9}{25}$ c. $\frac{3}{10}$ d. $\frac{7}{25}$

____ 14. If $\sin\theta=-\frac{3}{5}$ and θ terminates in the fourth quadrant, find the exact value of $\tan 2\theta$.

a. $-\frac{7}{24}$ b. $-\frac{24}{7}$ c. $-\frac{9}{25}$ d. $-\frac{25}{9}$

____ 15. Use a half-angle identity to find the exact value of tan 105°.

a. $-\sqrt{7+4\sqrt{3}}$ c. $\sqrt{7+4\sqrt{3}}$
b. $-\sqrt{7-4\sqrt{3}}$ d. $\sqrt{7-4\sqrt{3}}$

____ 16. Solve $5\tan x=5\sqrt{3}$ for $0°\le x\le 180°$.

a. 60° b. 150° c. 30° d. 120°

____ 17. Solve $2-3\cos x=5+3\cos x$ for $0°\le x\le 180°$.

a. 150° b. 30° c. 60° d. 120°

____ 18. Solve $\tan x=\cot x$ for $0\le x\le\pi$.

a. $\frac{\pi}{4},\frac{3\pi}{4}$ c. $\frac{\pi}{4},\frac{\pi}{2}$
b. $0,\frac{\pi}{4},\frac{\pi}{2}$ d. $0,\frac{\pi}{2}$

____ 19. Solve $\tan x \sec x - 2\tan x = 0$ for all real values of x.

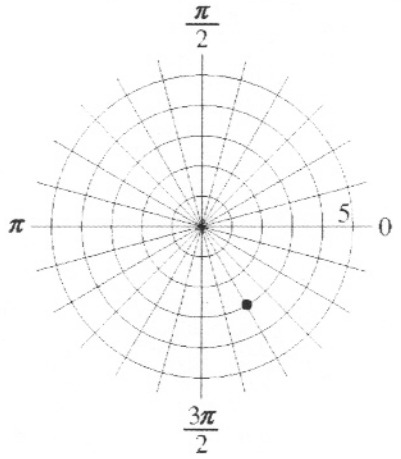
a. $0 + 2\pi k, \frac{2\pi}{3} + \pi k$

c. $0 + \pi k, \frac{\pi}{2} + 2\pi k$

b. $\frac{\pi}{3} + \pi k, \frac{2\pi}{3} + \pi k$

d. $0 + \pi k, \frac{\pi}{3} + 2\pi k, \frac{5\pi}{3} + 2\pi k$

____ 20. Name the polar coordinates of the point graphed below.



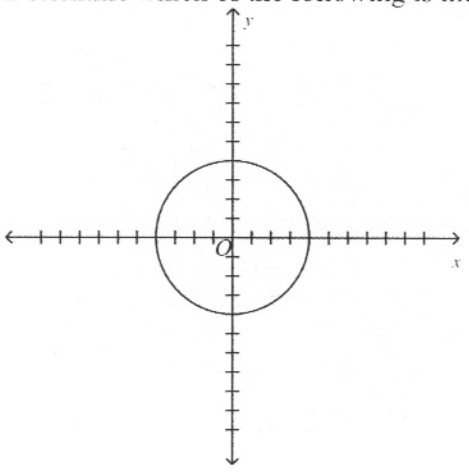
a. $\left(3, \frac{5\pi}{3}\right)$

c. $\left(3, \frac{5\pi}{4}\right)$

b. $\left(4, \frac{5\pi}{3}\right)$

d. $\left(4, \frac{5\pi}{4}\right)$

____ 21. Determine which of the following is the polar equation for the given graph.



a. $\theta = \frac{\pi}{10}$

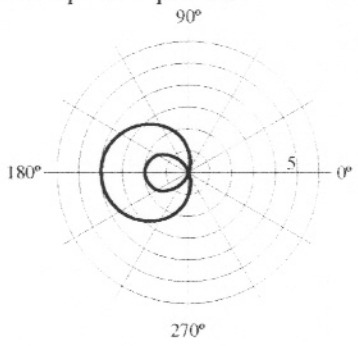
c. $r = 5$

b. $\theta = \frac{\pi}{9}$

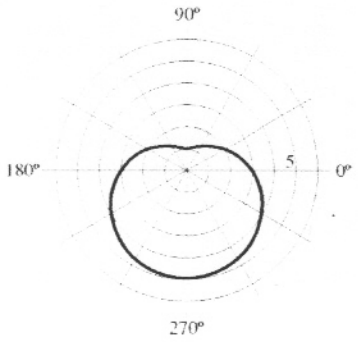
d. $r = 4$

____ 22. Graph the polar equation $r = 3 + 3\sin\theta$.

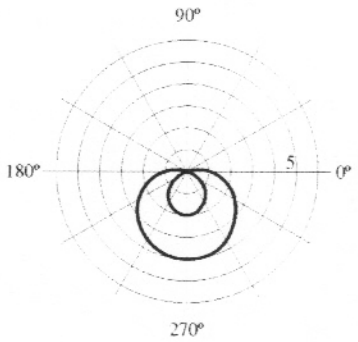
a.



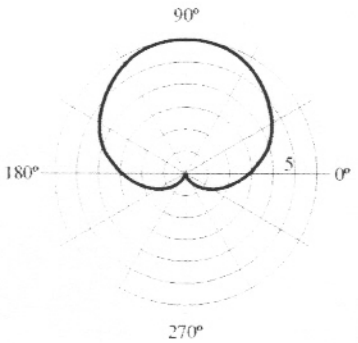
c.



b.



d.



____ 23. Find the polar coordinates of $(8, -8)$ for $r > 0$.

a. $(8\sqrt{2}, \frac{7\pi}{4})$

c. $(\frac{7\pi}{4}, 8\sqrt{2})$

b. $(-8\sqrt{2}, \frac{7\pi}{4})$

d. $(8, \frac{7\pi}{4})$

____ 24. Find the rectangular coordinates of $\left(9, 150°\right)$.

a. $\left(-\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$

c. $\left(\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$

b. $\left(-\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$

d. $\left(\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$

____ 25. Write the rectangular equation $(x+7)^2 + y^2 = 49$ in polar form.

a. $r = 14\cos\theta$

c. $r = \pm 7$

b. $r = -14\sin\theta$

d. $r = -14\cos\theta$

____ 26. Write the polar equation in rectangular form.
$r = -12\sin\theta$

a. $y = x + 6$

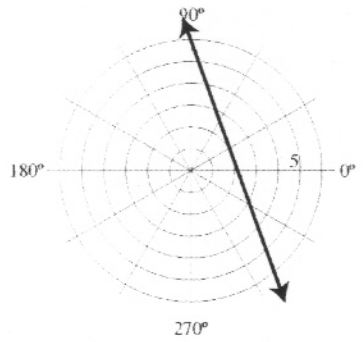
c. $(x+6)^2 + y^2 = 36$

b. $y = 12x$

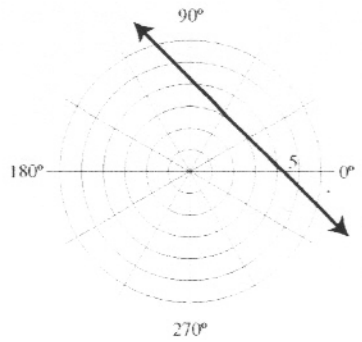
d. $x^2 + \left(y+6\right)^2 = 36$

____ 27. Graph the polar equation $2 = r\cos(\theta - 20°)$.

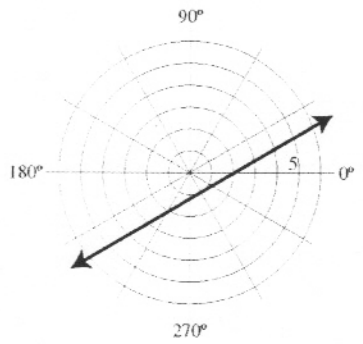
a.



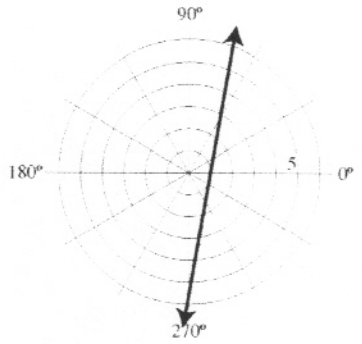
c.



b.



d.



____ 28. Write the expression $(-8 - 9i) + (2 - 8i)$ in the form $a + bi$.

a. $-10 - 17i$
b. $-6 - 1i$
c. $-6 - 17i$
d. $-10 - 1i$

____ 29. Determine the polar form of the complex number $3 - 2i$. Express the angle θ in degrees, where $0 \le \theta \le 360°$, and round numerical entries in the answer to two decimal places.

a. $3.61(\cos 326.31° + i\sin 326.31°)$
b. $3.61(\cos 326.31° - i\sin 326.31°)$
c. $326.31(\cos 3.61° + i\sin 3.61°)$
d. $326.31(\cos 326.31° - i\sin 326.31°)$

____ 30. Given $Z = 2(\cos 148° + i\sin 148°)$ and $W = 5(\cos 11° + i\sin 11°)$, find and simplify $\frac{Z}{W}$. Round numerical entries in the answer to two decimal places.

a. $10(\cos 137° - i\sin 137°)$
b. $0.4(\cos 137° + i\sin 137°)$
c. $0.4(\cos 137° - i\sin 137°)$
d. $10(\cos 137° + i\sin 137°)$

____ 31. Find $(1 - i)^6$. Express the result in rectangular form.

a. $9i$
b. $8i$
c. $6i$
d. $7i$

____ 32. Find $(-2 - 2i)^4$. Express in the form $a + bi$, with a and b to the nearest hundredth.

a. -64
b. $2.28 + 1.49i$
c. $1.52i$
d. -32

____ 33. Find $(-2 - 2i)^4$. Express the result in rectangular form.

a. $1.57 + 2.35i$
b. $0.72 + 1.08i$
c. $1.08 + 0.72i$
d. $0.93 + 1.40i$

____ 34. Find $(-1 - i\sqrt{3})^{10}$. Express the result in rectangular form.

a. $-1 - i\sqrt{3}$
c. $1 + i\sqrt{3}$
b. $-512 - 512i\sqrt{3}$
d. $-512 + 512i\sqrt{3}$

____ 35. Write the standard form of the equation for the circle that passes through the points $(-9, -16)$, $(-9, 32)$, and $(22, 15)$. Then identify the center and radius.

a. $(x-3)^2 + (y+9)^2 = 25$
$(-2, 8)$, 25

b. $(x+2)^2 + (y-8)^2 = 625$
$(-2, 8)$, 25

c. $(x+2)^2 + (y-8)^2 = 625$
$(-3, 9)$, 5

d. $(x-3)^2 + (y+9)^2 = 25$
$(-3, 9)$, 5

____ 36. Write the equation of the ellipse $9x^2 + 4y^2 - 72x + 40y + 208 = 0$ in standard form.

a. $(x-4)^2 + (y+5)^2 = 36$
c. $\dfrac{(x-4)^2}{4} + \dfrac{(y+5)^2}{9} = 1$
b. $\dfrac{(x-4)^2}{4} + \dfrac{(y-5)^2}{9} = 1$
d. $\dfrac{(x-4)^2}{9} + \dfrac{(y+5)^2}{4} = 1$

____ 37. What is an equation for the hyperbola with vertices $(3, 0)$ and $(-3, 0)$ and asymptote $y = \dfrac{7}{3}x$?

a. $49x^2 - 9y^2 = 441$
c. $49x^2 + 9y^2 = 441$
b. $49x^2 - 49y^2 = 441$
d. $9x^2 - 49y^2 = 441$

____ 38. Write the equation of the parabola $y = x^2 - 4x - 29$ in standard form.

a. $y + 33 = (x-2)^2$
c. $y + 4 = (x-2)^2$
b. $y + 29 = (x-2)^2$
d. $y - 2 = (x-2)^2$

____ 39. Identify the conic section represented by $3x^2 - 5xy - 2y^2 + 4x - 3y = 12$.

a. ellipse
c. circle
b. parabola
d. hyperbola