Mock Exam

* No calculator until #32-40

Name_____

1. Convert the measure to radians.

$1\frac{4}{5}$ revolutions counterclockwise from the x-axis

[A] $\frac{18\pi}{5}$ [B] $-\frac{9\pi}{5}$ [C] 648 [D] $\frac{18}{5}$

2. Solve: $4\sin x + 2 = 0$ (All solutions)

3. Express the angle in radian measure in terms of π.
Do not use a calculator. $80°$

[A] $\frac{9\pi}{4}$ [B] $\frac{4\pi}{9}$ [C] $\frac{8\pi}{9}$ [D] $\frac{9\pi}{8}$

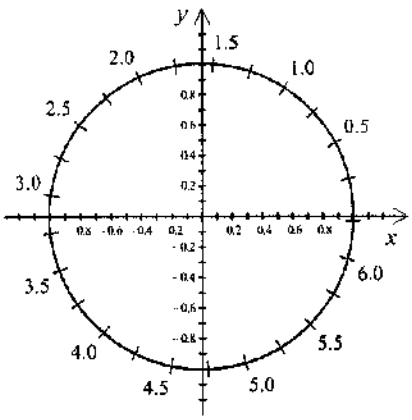
4. In which quadrant is the terminal side of the angle θ?

$\theta = -320°$

[A] Quad I [B] Quad II [C] Quad III [D] Quad IV

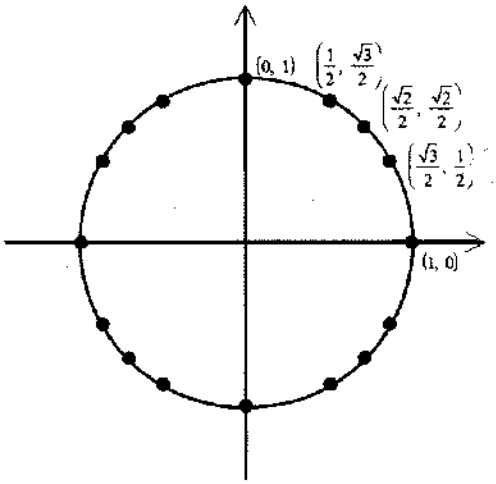
5. Use the unit circle and a straightedge to approximate the value of the expression.

$\cos(-4.25)$



[A] 0.45 [B] 0.89 [C] -0.45 [D] -0.89

6. Use the unit circle and symmetry to help you evaluate the function(s). $\tan\frac{\pi}{4}$



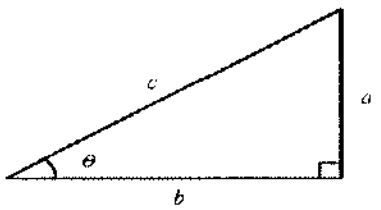
[A] 1 [B] $-\frac{\sqrt{2}}{2}$ [C] $\frac{\sqrt{3}}{3}$ [D] $\frac{\sqrt{2}}{2}$

7. Use the period of the function to select the expression that has the same value as the given expression. $\sin\left(-\frac{119\pi}{15}\right)$

[A] $\sin\frac{14\pi}{15}$ [B] $\sin\frac{4\pi}{15}$ [C] $\sin\frac{\pi}{15}$ [D] $\sin\frac{\pi}{5}$

8. Identify the ratio that defines the trigonometric function of the angle θ. $\sin\theta$

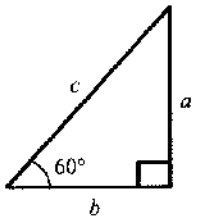
[A] $\frac{c}{a}$ [B] $\frac{a}{c}$ [C] $\frac{b}{c}$ [D] $\frac{a}{b}$



9. Identify the ratio $\frac{b}{c}$ for the indicated angle and find its value.

[A] $\tan 60° = \sqrt{3}$ [B] $\sin 60° = \frac{\sqrt{3}}{2}$

[C] $\cos 60° = \frac{1}{2}$ [D] $\sec 60° = \frac{1}{2}$



10. Let θ be an acute angle. Use the given function value and trigonometric identities to find the indicated trigonometric function.

If $\csc\theta = \frac{25}{24}$, find $\sin\theta$.

[A] $\frac{25}{7}$ [B] $\frac{7}{25}$ [C] $\frac{24}{25}$ [D] $\frac{7}{24}$

11. Use the fundamental trigonometric identities to determine the simplified form of the expression. $\frac{\sec\beta}{\csc\beta}$

[A] $\cos\beta$ [B] $\tan\beta$ [C] $\cot\beta$ [D] $\sin\beta$

12. Identify the quadrant in which θ lies.

$\sin > 0$ and $\tan < 0$

[A] Quad I [B] Quad II [C] Quad III [D] Quad IV

For #13 and 14, find the reference angle θ'.

13. $\theta = -\frac{5\pi}{6}$

[A] $-\frac{\pi}{6}$ [B] $-\frac{7\pi}{6}$ [C] $\frac{5\pi}{6}$ [D] $\frac{\pi}{6}$

14. $\theta = 1.9$

[A] 1.9 [B] 4.3832 [C] 1.2416 [D] 0.3292

15. Find the exact value of the function. $\csc(-315°)$

[A] $\sqrt{2}$ [B] 1 [C] $\sqrt{3}$ [D] $-\frac{\sqrt{3}}{3}$

16. Factor the expression and use the fundamental identities to simplify. $\cos^4 x - 2\cos^2 x + 1$

[A] $-\sin^4 x$ [B] $\sin^4 x$ [C] 1 [D] $\cos^4 x$

17. Convert all of the terms to sines and cosines and simplify to find the expression that completes the identity. $\frac{\sec x}{\tan x} =$

[A] $\frac{\sin^2 x}{\cos^2 x}$ [B] $\frac{1}{\sin x}$ [C] 1 [D] $\frac{\sin^2 x}{\cos x}$

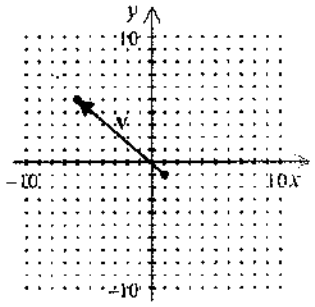
18. Identify the x-values that are solutions of the equation.

$12\cot^2 x - 4 = 0$

[A] $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ [B] $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

[C] $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ [D] $\frac{\pi}{4}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{5\pi}{6}$

19. Identify the initial and terminal points of a vector that has the same direction as v.

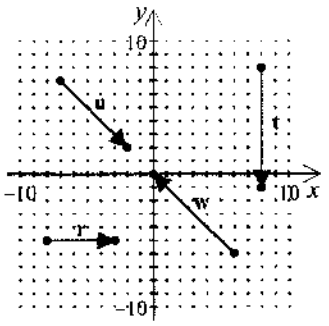


[A] $(0, -3)$ to $(6, -10)$ [B] $(-4, -2)$ to $(-10, 5)$

[C] $(-4, -2)$ to $(3, 4)$ [D] $(0, -3)$ to $(-7, 3)$

20. Identify the vector with the same magnitude as v.

$\mathbf{v} = \overrightarrow{AB}$ with $A = (0, 0)$ and $B = (5, 5)$.



[A] w [B] t [C] r [D] u

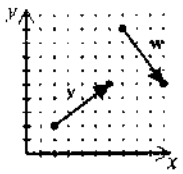
21. Identify the pair of points that could be the initial and terminal points of the vector. $\mathbf{u} = \langle 2, -5 \rangle$

[A] $(-6, 4)$ and $(-1, 2)$ [B] $(0, 3)$ and $(-5, 1)$
[C] $(-5, 1)$ and $(-7, -4)$ [D] $(-1, 2)$ and $(1, -3)$

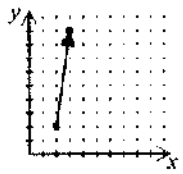
22. Identify the initial point of vector **v**.
Given that $\mathbf{v} = \langle -3, -3 \rangle$; terminal point is $(3, -8)$

[A] $(-5, 6)$ [B] $(9, -2)$ [C] $(6, -5)$ [D] $(0, -11)$

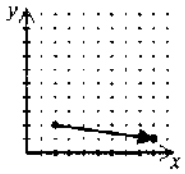
23. Use the figure to identify the graph of the result of the specified vector operation.
$\mathbf{v} + \mathbf{w}$



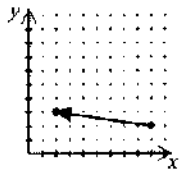
[A]



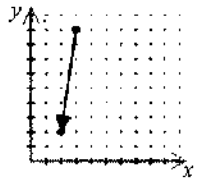
[B]



[C]



[D]



24. Let $\mathbf{u} = -9\mathbf{i} + 2\mathbf{j}$ and $\mathbf{v} = 5\mathbf{i} - 3\mathbf{j}$. Find $2\mathbf{u} - 5\mathbf{v}$.

[A] $-18\mathbf{i} + 15\mathbf{j}$ [B] $7\mathbf{i} + 11\mathbf{j}$
[C] $-2\mathbf{i} + 6\mathbf{j}$ [D] $-43\mathbf{i} + 19\mathbf{j}$

25. Find the number by which the components of the vector can be divided to find the unit vector in the same direction.
$\mathbf{u} = 9\mathbf{i} - 7\mathbf{j}$

[A] $4\sqrt{2}$ [B] 130 [C] $\sqrt{130}$ [D] 65

26. Express $\sqrt{-3}$ in the form bi where b is a real number.

[A] $-3i$ [B] $\sqrt{3}i$ [C] $\sqrt{-3}i$ [D] $-\sqrt{3}i$

27. Which is the complex number in standard form? $i + 9i^2$

[A] $9 + i$ [B] $-9 + i$ [C] $-8i$ [D] $-9 - i$

28. $(-6 + 6i)(-1 + 7i)$

[A] $48 - 36i$ [B] $-36 + 48i$
[C] $-36 - 48i$ [D] $48 - 48i$

29. $(-4 + 5i) + (-6 - 7i)$

[A] $-10 + 2i$ [B] $-10 - 2i$
[C] $2 + 12i$ [D] $59 - 2i$

For #30 and 31, simplify and write the result in standard form.

30. $\dfrac{8 - 7i}{5i}$

[A] $\dfrac{35 + 8i}{25}$ [B] $\dfrac{-7 - 8i}{25}$
[C] $\dfrac{35 + 8i}{5}$ [D] $\dfrac{-7 - 8i}{5}$

31. $\dfrac{-3 + 3i}{-3 - i}$

[A] $\dfrac{3 - 6i}{8}$ [B] $\dfrac{3 - 6i}{5}$ [C] $\dfrac{12 + 6i}{5}$ [D] $\dfrac{12 + 6i}{8}$

(Calc ok)

32. Solve for x. $7x^2 + 45 = 0$

[A] $x = \dfrac{\pm 3\sqrt{5}i}{7}$ [B] $x = \dfrac{\pm 3\sqrt{35}i}{7}$

[C] $x = \dfrac{\pm \sqrt{35}i}{15}$ [D] $x = \pm 3\sqrt{5}i$

33. At a distance of 31 feet from the base of a flag pole, the angle of elevation to the top of a flag that is 5.1 feet tall is 41.1°. The angle of elevation to the bottom of the flag is 35.2°. The pole extends 1 foot above the flag. Find the height of the pole.

[A] 23.4 ft [B] 22.4 ft [C] 28 ft [D] 27 ft

34. Use the given measures to find the area of triangle *ABC*.
$A = 23°,\ a = 9.2,\ b = 9.2$

[A] 29.40 [B] 60.88 [C] 16.54 [D] 30.44

35. A hiker travels at 2.5 miles per hour at a heading of S 56° E from a ranger station. After 5 hours, how far south and how far east is the hiker from the ranger station?

[A] 7.0 miles south and 10.4 miles east
[B] 10.7 miles south and 6.5 miles east
[C] 10.4 miles south and 7.0 miles east
[D] 6.5 miles south and 10.7 miles east

36. A pole 55 feet tall is situated at the bottom of a hill that slopes up at an angle of 12.5°. A guy wire from the top of the pole to the hillside forms an angle of 40° with the top of the pole. Find the distance from the base of the pole to the guy wire's point of attachment.

[A] 39.9 ft [B] 37.1 ft [C] 38.7 ft [D] 35.2 ft

37. The needle of the scale in the bulk food section of a supermarket is 22 cm long. Find the distance the tip of the needle travels when it rotates 64°.

[A] 24.6 cm [B] 140.8 cm [C] 12.3 cm [D] 3.9 cm

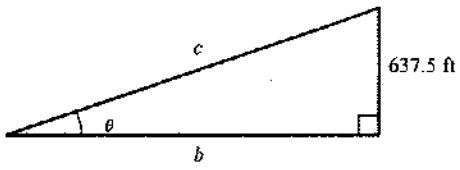
38. Use the given measures and the Law of Cosines to solve triangle *ABC*.
$a = 12,\ b = 21,\ c = 13$

[A] $A = 97.2°;\ B = 24.2°;\ C = 58.6°$
[B] $A = 114.2°;\ B = 31.4°;\ C = 34.4°$
[C] $A = 24.2°;\ B = 97.2°;\ C = 58.6°$
[D] $A = 31.4°;\ B = 114.2°;\ C = 34.4°$

39. A 16-foot ladder makes an angle of 66° with the ground as it leans against a building. How far up the building does the ladder reach?

[A] 35.94 ft [B] 6.51 ft [C] 14.62 ft [D] 17.51 ft

40. The cable supporting a ski lift rises 3 feet for each 8 feet of horizontal length. The top of the cable is fastened 637.5 feet above the cable's lowest point. Find the lengths *b* and *c*, and find the measure of angle θ.



[A] $b = 1816$ ft, $c = 1700$ ft, $\theta = 22.0°$
[B] $b = 239$ ft, $c = 681$ ft, $\theta = 69.4°$
[C] $b = 681$ ft, $c = 239$ ft, $\theta = 0.4°$
[D] $b = 1700$ ft, $c = 1816$ ft, $\theta = 20.6°$