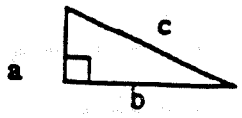
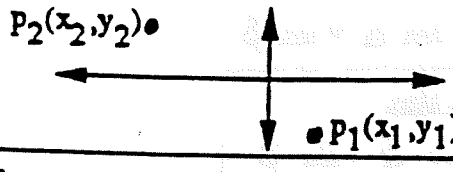
TRIG. FORMULAS WE ALL KNOW AND LOVE AND ARE RESPONSIBLE FOR!!!

NAME _____

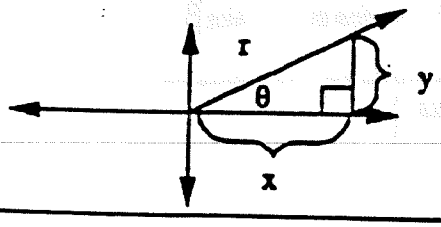


$$a^2 + b^2 = c^2$$

2. distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$



3.



4.

$r^2 = x^2 + y^2$

or

$r = \pm\sqrt{x^2 + y^2}$

Q1 all > 0
Q2 sin, csc > 0
Q3 tan, cot > 0
Q4 cos, sec > 0

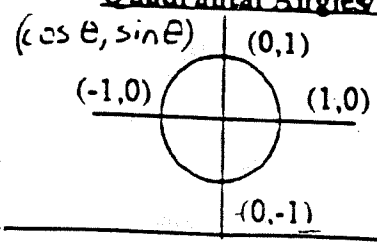
5. **Trig. Functions** / **Reciprocals**

$\sin\theta = \frac{y}{r}$ $\quad$ $\csc\theta = \frac{r}{y}$, $y \neq 0$

$\cos\theta = \frac{x}{r}$ $\quad$ $\sec\theta = \frac{r}{x}$, $x \neq 0$

$\tan\theta = \frac{y}{x}$ $x \neq 0$ $\quad$ $\cot\theta = \frac{x}{y}$, $y \neq 0$

6. **Quadrantal Angles/unit circle**

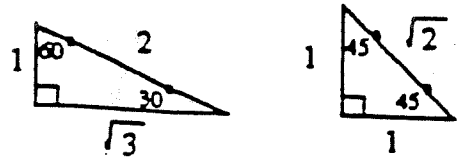


$\cos 90^\circ = 0$

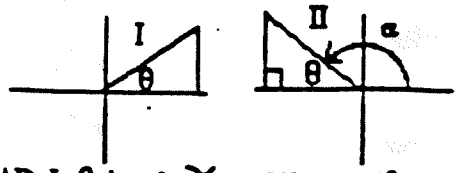
$\sin 90^\circ = 1$

$\cos 180^\circ = -1$

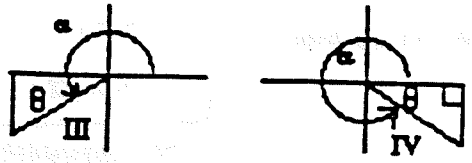
7. **Right Triangle Patterns**



8. **To find Reference Angle θ**



QUAD I, θ is ref ∡ $\quad$ QUAD II, θ is $180^\circ - \alpha$



QUAD III, θ is $(\alpha - 180^\circ)$ $\quad$ In QUAD IV, θ is $(360^\circ - \alpha)$

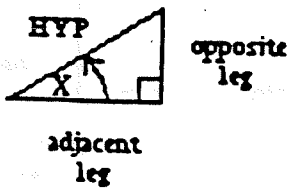
9. **Rules of COFUNCTIONS**

$\sin\theta = \cos(90 - \theta)$
$\cos\theta = \sin(90 - \theta)$
$\tan\theta = \cot(90 - \theta)$
$\cot\theta = \tan(90 - \theta)$
$\sec\theta = \csc(90 - \theta)$
$\csc\theta = \sec(90 - \theta)$

10. **COTERMINAL angles**

coterminal ∡ $= \theta + n(360^\circ)$
where θ is original ∡ and n = integer

11. **TRIG functions in reference to right △**

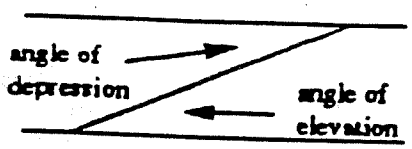


$\sin X = \frac{opp}{HYP}$ $\quad$ $\cos X = \frac{adj}{HYP}$

$\tan X = \frac{opp}{adj}$ $\quad$ $\cot X = \frac{adj}{opp}$

$\sec X = \frac{HYP}{adj}$ $\quad$ $\csc X = \frac{HYP}{opp}$

12.



13. Changing Degrees to Radians

$$(\#\text{ of Degrees})\left(\frac{\pi}{180^\circ}\right) = \#\text{ of Radians}$$

Changing Radians to Degrees

$$(\#\text{ of Radians})\left(\frac{180^\circ}{\pi}\right) = \#\text{ of Degrees}$$

14. ARC length in radians

$$\underset{\text{arc length}}{L} = \underset{\text{angle radians}}{\theta} * \underset{\text{length of radius}}{r}$$

15. Properties of sine and cosine

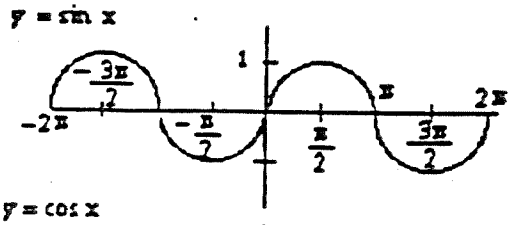
$\sin(-\theta) = -\sin\theta$
$\cos(-\theta) = \cos\theta$

Change the sign for:

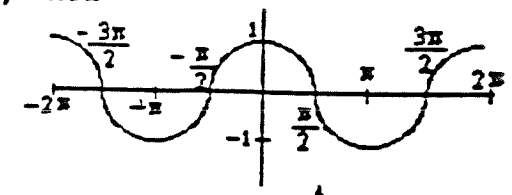
$(\pi+\theta)$ for both sine and cosine
$(2\pi-\theta)$ for sine $(2\pi-\theta)$
$(\pi-\theta)$ for cosine

16. Most often used Graphs

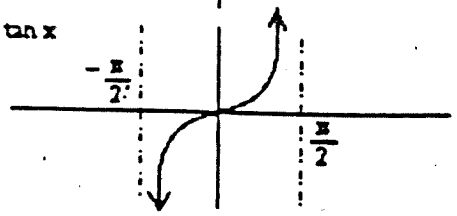
$y = \sin x$



$y = \cos x$



$y = \tan x$



17. Properties of Graphs

$y = a * \sin x$
$y = a * \cos x$
$|a|$ is amplitude
$y = \sin b * x$
$y = \cos b * x$
coefficient of x divided into period tells period of adjusted graph.

for sine and cosine $\frac{2\pi}{|b|}$ = period

for tangent $\frac{\pi}{|b|}$ = period

18. Identities

$\sin\theta = \frac{1}{\csc\theta}$ $\qquad \tan\theta = \frac{\sin\theta}{\cos\theta}$

$\cos\theta = \frac{1}{\sec\theta}$ $\qquad \cot\theta = \frac{\cos\theta}{\sin\theta}$

$\tan\theta = \frac{1}{\cot\theta}$

$\sin^2\theta + \cos^2\theta = 1$

$\tan^2\theta + 1 = \sec^2\theta$

$\cot^2\theta + 1 = \csc^2\theta$

19. sum/difference iden. for cosine

$\cos(\alpha-\beta) = \cos\alpha * \cos\beta + \sin\alpha * \sin\beta$

$\cos(\alpha+\beta) = \cos\alpha * \cos\beta - \sin\alpha * \sin\beta$

20. sum/difference identities for sine

$\sin(\alpha-\beta) = \sin\alpha * \cos\beta - \cos\alpha * \sin\beta$

$\sin(\alpha+\beta) = \sin\alpha * \cos\beta + \cos\alpha * \sin\beta$

21. Double Angle Formulas

$\sin 2\alpha = 2 * \sin\alpha \cos\alpha$

$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$

$\cos 2\alpha = 2\cos^2\alpha - 1$

$\cos 2\alpha = 1 - 2 * \sin^2\alpha$

22. Half Angle Formulas

$$\sin\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1-\cos\alpha}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1+\cos\alpha}{2}}$$

23. Law of sines

(use when given AAS or ASA)

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

24. Law of cosines

(use when given SSS or SAS)

$c^2 = a^2 + b^2 - 2ab * \cos C$

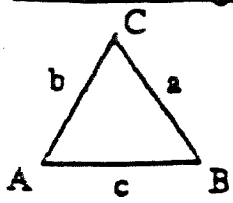
$a^2 = b^2 + c^2 - 2bc\cos A$
$b^2 = a^2 + c^2 - 2ac\cos B$

25. Ambiguous case for Δ's

occurs when given SSA.
Can be 1,2, or no triangles formed

1) $A < 90^\circ$ $a < b$ $\qquad a \geq b$ 1Δ
$a < b\sin A$ no Δ
$a = b\sin A$ 1 Δ
$a > b\sin A$ 2 Δ
2) $A \geq 90^\circ$ $a \leq b$ no Δ

26. Area of Triangle



$$\text{area} = \frac{1}{2}bc * \sin A$$
$= \frac{1}{2}ab\sin C$
$= \frac{1}{2}ac\sin B$

27. Heron's Formula:

$$s = \frac{1}{2}(a + b + c)$$

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{hgt} = \frac{2}{\text{base}} * \sqrt{s(s-a)(s-b)(s-c)}$$

28. Inverse Relations (lower case "a")

original: $y = \sin x$
inverse $x = \sin y$

proper symbolism $y = \text{arc} \sin x$ or $y = \sin^{-1} x$

29. Inverse Functions (capital "A")

original $y = \sin x$
inverse function $y = \text{Arc} \sin x$

$-90° \le y \le 90°$ use quadrants I and IV	$0° \le y \le 180°$ use quadrants I and II
Arc sin Arc csc $y \neq 0°$ Arc tan < only	Arc cos Arc sec $y \neq 90°$ Arc cot < only

30. Special Angle Chart

Angle	0	30	45	60	90
sin	0	$\frac{1}{2}$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\sqrt{2}/2$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	-

Name _____ Date _____ Score _____

CUMULATIVE TEST: CHAPTERS 1-5

Choose the correct answer. Write the letter of your choice in the answer column.

(1-1) 1. Find the distance between $P_1(-4,-3)$ and $P_2(1,1)$.

a. 9 b. 20 c. $3\sqrt{3}$ d. $\sqrt{41}$ 1. _____

(1-2) 2. Find the quadrant which contains the terminal side of an angle θ in standard position and with a measure of 275°.

a. III b. IV c. II d. I 2. _____

(1-3) 3. The terminal side of an angle θ in standard position passes through the point $P(-1,-3)$. Find $\cos\theta$.

a. $\sqrt{10}$ b. 10 c. $\frac{\sqrt{10}}{10}$ d. $\frac{\sqrt{10}}{10}$ 3. _____

(1-4) 4. If $\tan\theta = -2$ and θ is in Quadrant II, find $\sec\theta$.

a. $-\sqrt{5}$ b. $\sqrt{5}$ c. $5\sqrt{5}$ d. $-5\sqrt{5}$ 4. _____

(1-5) 5. For an angle θ in standard position where $\theta = -225°$, find the measure of its reference angle.

a. 225° b. 45° c. 145° d. 135° 5. _____

6. The terminal side of an angle in standard position passes through $P(-1,\sqrt{3})$. Find the measure of this angle.

a. 120° b. 240° c. 60° d. 330° 6. _____

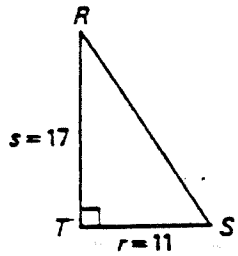
(1-6) 7. use a calculator to find $\cos 39° 30'$.

a. −0.7716 b. 0.7671 c. −0.7671 d. 0.7716 7. _____

(1-7) 8. use a calculator to find $\cot 20° 15'$.

a. 1.7107 b. 1.7117 c. 2.7117 d. 2.7107 8. _____

(1-8) 9. In $\triangle RST$, $r = 11$ and $s = 17$. Find R to the nearest ten minutes.



a. 30° 40′ b. 32° 50′

c. 28° 30′ d. 34° 20′

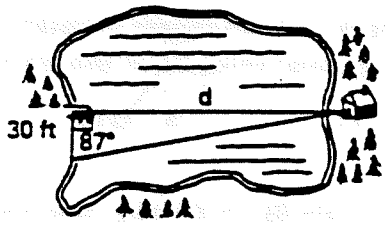
9. _____

(1-9) 10. The top of a flagpole is sighted at an angle of elevation of 48° from a point on the ground 25 meters from the base of the pole. Find the height of the flagpole to the nearest tenth of a meter.

a. 27.8 m b. 27.5 m c. 27.7 m d. 27.6 m

10. _____

(1-10) 11. A cabin on the shore of a lake is opposite a dock. Given the information provided in the figure, find d, the distance between the cabin and the dock, to the nearest tenth of a foot.



a. 572.4 ft b. 600.9 ft

c. 542.8 ft d. 1000.7 ft

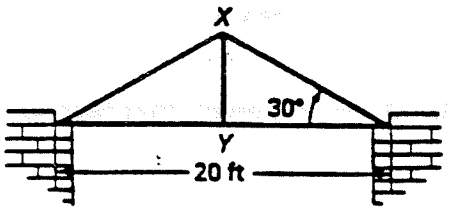
11. _____

(1-11) 12. A sloop, starting from point A, sails 50 kilometers west and then 75 kilometers due north. How far away from point A is the sloop? Express the answer to the nearest tenth of a kilometer.

a. 89.6 km b. 90.1 km c. 92.0 km d. 85.5 km

12. _____

(1-12) 13. A truss for a bridge is constructed with measurements as shown. Find the length, to the nearest tenth of a meter, of the tie rod, XY.



a. 8.5 m b. 7.4 m

c. 9.4 m d. 5.8 m

13. _____

(2-1) 14. Change 210° to radian measure in terms of π.

a. $\frac{7}{6}\pi$ b. $\frac{3}{5}\pi$ c. $\frac{5}{6}\pi$ d. $\frac{4}{3}\pi$ 14. _____

(2-2) 15. Find the degree measure of an angle whose radian measure is 3.1416.

a. 0 b. 60° 20′ c. 180° d. 20° 60′ 15. _____

16. A central angle of $\frac{\pi}{2}$ radians in a circle with a radius of 8 centimeters subtends $\widehat{AB}$. Find the length of $\widehat{AB}$.

a. 16π b. 2π c. 8π d. 4π 16. _____

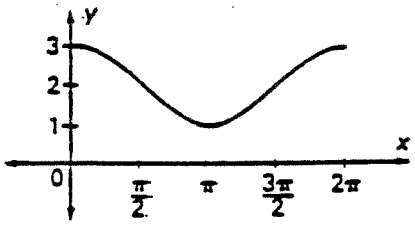
(2-3) SKIP ~~17.~~ During the interval $t = 3$ seconds, the angular displacement of a point P of an object in rotary motion is 2.5 radians. Find the angular velocity of this point in radians per second.

a. 1.2 b. 0.83 c. 7.5 d. 0.253 17. b

(2-4) 18. Given sin 55° = 0.8192, find sin(−55°).

a. −0.8219 b. 0.8219 c. 0.8192 d. −0.8192 18. _____

(2-5) 19. Select the function that best represents the graph at the right.



a. $y = \sin x + 2$

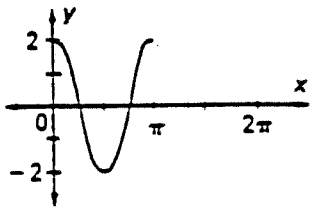
b. $y = \sin x - 2$

c. $y = \cos x + 2$

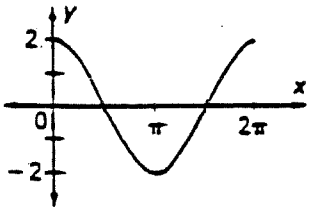
d. $y = \cos x - 2$ 19. _____

(2-6) 20. Select the graph that represents the function, $y = 2\cos x$.

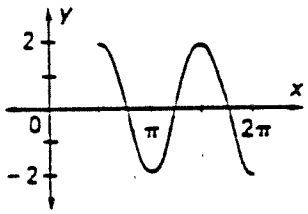
a.



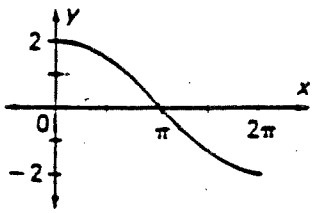
b.



c.

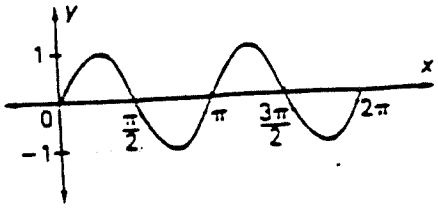


d.



20. _____

(2-7) 21. Select the function that represents the graph at the right.



a. $y = \cos 2x$

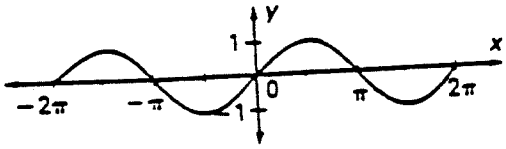
b. $y = \sin 2x$

c. $y = 2 \sin x$

d. $y = 2 \cos x$

21. _____

(2-8) 22. Select the function that represents the graph at the right.



a. $y = \cos(x - 2\pi)$

b. $y = \sin(x + 2\pi)$

c. $y = \sin(x - \pi)$

d. $y = \cos(x + 2\pi)$

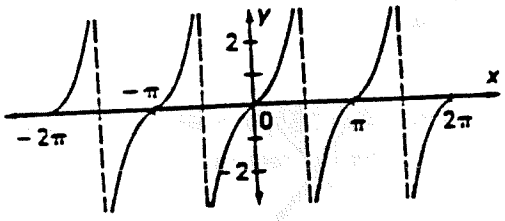
22. _____

(2-9) 23. What is the value of $\sin 90° + \sin 30°$?

a. $\frac{2}{3}$ b. $\frac{1}{2}$ c. $\frac{3}{2}$ d. 60

23. _____

(2-10) 24. Select the function that best represents the graph at the right.



a. $\sec x$ b. $\tan x$

c. $\cot x$ d. $\csc x$

24. _____

(3-1) 25. Which of the following is equivalent to $1 - \sin^2 \alpha$?

a. $\cos^2 \alpha$ b. $\cos \alpha$ c. $\tan^2 \alpha$ d. 1

25. _____

26. What is another expression for $\frac{1}{\tan \beta}$?

a. $\cot \beta$ b. $\sin \beta$ c. $-\tan \beta$ d. $-\cot \beta$

26. _____

(3-2) 27. Find the expression that is an identity.

a. $\frac{\sec \theta}{\cos \theta} + \frac{\tan \theta}{\cot \theta} = 1$

b. $\frac{\sec \theta}{\cos \theta} - \frac{\tan \theta}{\cot \theta} = 1$

c. $\frac{\cos \theta}{\sec \theta} - \frac{\tan \theta}{\cot \theta} = 1$

d. $\frac{\sec \theta}{\cos \theta} + \frac{\cot \theta}{\tan \theta} = 1$

27. _____

(3-3) 28. Evaluate $\cos\left(\frac{\pi}{4} - \frac{\pi}{3}\right)$. ~~Do not use tables.~~

a. $\frac{\sqrt{2}+\sqrt{6}}{4}$ b. $\frac{\sqrt{3}+\sqrt{6}}{4}$ c. $\frac{-\sqrt{2}-\sqrt{6}}{4}$ d. $\frac{-\sqrt{2}+\sqrt{6}}{4}$ 28. _____

(3-4) 29. Evaluate $\sin(45° + 30°)$. ~~Do not use tables.~~

a. $\frac{-\sqrt{6}+\sqrt{2}}{4}$ b. $\frac{\sqrt{6}+\sqrt{2}}{4}$ c. $\frac{-\sqrt{2}+\sqrt{6}}{2}$ d. $\frac{-\sqrt{2}-\sqrt{6}}{2}$ 29. _____

(3-5) 30. , evaluate $\tan(45° + 30°)$.

a. $-2 - \sqrt{3}$ b. $2 + \sqrt{3}$ c. $\sqrt{3}$ d. 3 30. _____

(3-6) 31. Evaluate $\sin 2\alpha$, given that $\alpha = 25°$, $\sin\alpha = 0.42$, and $\cos\alpha = 0.91$.

a. 1.32 b. 0.378 c. 0.48 d. 0.756 31. _____

(3-7) 32. Evaluate $\sin\frac{\pi}{8}$.

a. $2 - \sqrt{2}$ b. $\sqrt{2+\sqrt{2}}$

c. $\frac{1}{2}\sqrt{2-\sqrt{2}}$ d. $\frac{1}{2}\sqrt{2+\sqrt{2}}$ 32. _____

(3-8) ~~33.~~ Express $2\sin x \cos 2x$ as a sum.

SKIP

a. $\sin 3x - \sin x$ b. $\cos 3x + \cos x$

c. $\sin 6x$ d. $\cos 6x$ 33. _____

(4-1) 34. In ΔABC, $A = 35°$, $B = 65°$, and $c = 6.0$.
Find a to the nearest tenth.

SKIP

a. 3.8 b. 9.4 c. 3.5 d. 10.9 34. _____

(4-2) 35. In ΔABC, $A = 55°$, $b = 8.6$, and $c = 6.5$.
Find a to the nearest tenth.

SKIP

a. 7.2 b. 7.1 c. 7.3 d. 7.0 35. _____

36. In ΔABC, $a = 6.5$, $b = 8$, $c = 12$. Find A to the nearest 10 minutes.

SKIP

a. 30° 20′ b. 30° 30′ c. 38° 24′ d. 111° 17′ 36. _____

(4-3) 37. In ΔABC, $A = 50°$, $c = 6$, and $a = 5$. Find the number of possible solutions for this triangle.

SKIP

a. One b. Three c. Two d. None 37. _____

(4–5) 39. In ΔABC, $A = 45°$, $b = 6$ cm; and $c = 7$ cm. Find the area of the triangle to the nearest tenth of a square centimeter.

Skip

a. 21 cm b. 42 cm c. 14.8 cm d. 29.6 cm 39. _____

(4–6) 40. In ΔRST, $r = 5$, $s = 6$, and $t = 7$. Find the area of this triangle to the nearest tenth of a square unit.

Skip

a. 236.9 b. 14.7 c. 4.8 d. 24.0 40. _____

(5–1) 45. Find the inverse of $y = \cos x$.

a. $y = \sin x$ b. $x = \text{arc} \cos y$

c. $y = \text{arc} \sin x$ d. $x = \sin y$ 45. _____

(5–2) 46. Evaluate $\sin (\text{Arc} \cos \frac{1}{5})$.

a. 0.2 b. 78.5 c. 11.5 d. 0.9798 46. _____

(5–3) 47. Evaluate $\cot (\text{Arc} \tan 2)$.

a. 2.0000 b. 63.4 c. 0.5000 d. 89.1 47. _____

(5–4) 48. Solve for x: $\sin x + \cos x = 0$.

a. 45°; 135° b. 45°; 225° c. 45°; 315° d. 135°; 315° 48. _____

(5–5) 49. Change the given rectangular coordinates, $(-1, -1)$, to polar coordinates.

Skip

a. $(1, \pi)$ b. $(\sqrt{2}, 135°)$ c. $(\sqrt{2}, \frac{5}{4}\pi)$ d. $(-1, -\pi)$ 49. _____

(5–6) 50. Select the equation that best represents the graph at the right.

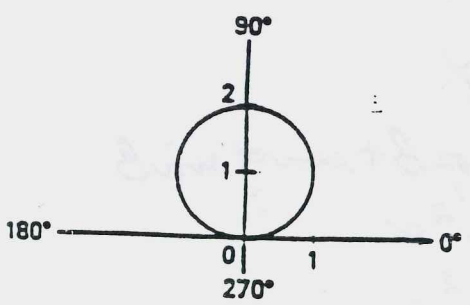
Skip

a. $r = 2 \sin \theta$

b. $\theta = 2 \sin r$

c. $r = \sin 2\theta$

d. $r = \frac{1}{2} \sin 2\theta$



50. _____

(Formulas)

Matching

____	(a) $\text{Arccos}\, x$
____ 52. $r\cos\theta$	
____ 53. $\frac{a+b+c}{2}$	(c) y
____ 54. $P_1P_2 = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$	(d) s
____	
____ 56. x^2+y^2	(f) r^2
____ 57. $r\sin\theta$	(g) distance formula
____	(h) x
____ 59. $\cos^{-1} x$	
____	

(Identities)

True or False:

1. $\sin\theta = \frac{1}{\cos\theta}$
2. $\sin^2\theta + \cos^2\theta = 1$
3. $1 + \csc^2\theta = \cot^2\theta$
4. $\cos(\alpha-\beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$
5. $\sin 2\alpha = 1 - 2\sin^2\alpha$
6. $\cos 2\alpha = 1 - 2\cos^2\alpha$

8. $\cos(\alpha+\beta) = \cos\alpha\sin\beta - \sin\alpha\cos\beta$
9. $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$

Simplify $\cos x + \sin^2 x \sec x$.

a. $\sin^2 x$ b. $\tan^2 x$ c. $\cos x$ d. $\sec x$

2 If $\sin x = u$, then $\sec^2 x =$ ___?___.

a. $\frac{1}{1-u^2}$ b. $\frac{1}{1+u^2}$ c. $\frac{1}{u^2}$ d. $\frac{\pm 1}{\sqrt{1-u^2}}$

3 Express $\cos 255°$ in simplest radical form.

a. $-\frac{\sqrt{2}+\sqrt{6}}{4}$ b. $\frac{\sqrt{6}-\sqrt{2}}{4}$ c. $\frac{\sqrt{2}-\sqrt{6}}{4}$ d. $\frac{1-\sqrt{3}}{2}$

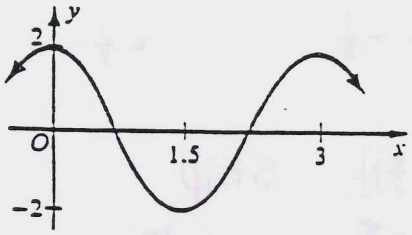
4 If $f(x)$ has period 6, then $f(2x)$ has period ___?___.

a. 2 b. 3 c. 12 d. 18

5 Which of the following is an equation of the cosine curve shown?

a. $y = 2\cos\frac{2x}{3}$ b. $y = 2\cos\frac{3\pi x}{2}$

c. $y = 2\cos\frac{2\pi x}{3}$ d. $y = 2\cos 3\pi x$



6 Which of the following is an equation of a sine curve with maximum value 2, minimum value 0, and period $\frac{\pi}{3}$?

a. $y = 2 + \sin 3\pi x$ b. $y = 2\sin 3x$

c. $y = 1 + \sin 6\pi x$ d. $y = 1 + \sin 6x$

7 State the period of the function defined by $y = 2\tan \pi x$.

a. 1 b. 2 c. π d. 2π

8 Express 210° in radians.

a. $\frac{7\pi}{3}$ b. $\frac{5\pi}{6}$ c. $\frac{7\pi}{6}$ d. $\frac{7\pi}{12}$

9 Express $\frac{11\pi}{3}$ radians in degrees.

a. 630° b. 300° c. 330° d. 660°

10 Find the exact value of $\sec\left(-\frac{5\pi}{3}\right)$.

a. $\frac{\sqrt{3}}{2}$ b. $-\frac{\sqrt{3}}{2}$ c. 2 d. -2

11 If $\tan s = \sqrt{3}$ and $-\pi < s < 0$, then $s =$ ___?___.

a. $-\frac{2\pi}{3}$ b. $-\frac{4\pi}{3}$ c. $-\frac{5\pi}{6}$ d. $-\frac{7\pi}{6}$

12 In $\triangle ABC$, $\angle B = 30°$ and $c = 20$. For what values of b will the triangle have two solutions?

a. $0 < b < 10$ b. $10 < b < 20$ c. $20 < b$ d. for no b SKIP

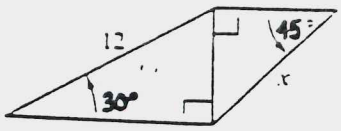
13 A triangular tract of forest land has sides of lengths 3 km, 6 km, and 7 km. Find its area. SKIP

a. $\sqrt{15}$ km² b. 4 km² c. 8 km² d. $4\sqrt{5}$ km²

14 Find x in the adjacent figure.

a. $\sqrt{6}$ b. $3\sqrt{2}$

c. $2\sqrt{3}$ d. $6\sqrt{2}$



15 Find $\sec\theta$ if the terminal side of θ passes through $(-3, 5)$ when θ is in standard position.

a. $-\frac{\sqrt{34}}{3}$ b. $\frac{\sqrt{34}}{5}$ c. $-\frac{5}{3}$ d. $\frac{5}{4}$

16 Find $\cos\theta$ if $\tan\theta = -\frac{12}{5}$ and $-90° < \theta < 90°$.

a. $\frac{12}{13}$ b. $-\frac{5}{13}$ c. $\frac{5}{13}$ d. $-\frac{12}{13}$

17 Give the exact value of $\cos 240°$.

a. $-\frac{1}{2}$ b. $\frac{1}{2}$ c. $-\frac{\sqrt{3}}{2}$ d. $\frac{\sqrt{3}}{2}$

18 If $\sin\theta = \frac{3}{4}$, then $\cos 2\theta =$ ___?___.

a. $\frac{7}{16}$ b. $-\frac{1}{8}$ c. $\frac{1}{8}$ d. $\frac{1}{2}$

~~19~~ ? SKIP Evaluate $\text{Cos}^{-1}\left[\cos\left(-\frac{\pi}{3}\right)\right]$. SKIP

a. $\frac{\pi}{3}$ b. $-\frac{\pi}{3}$ c. $\frac{2\pi}{3}$ d. $\frac{5\pi}{6}$

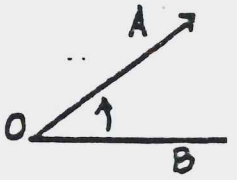
20 Evaluate $\text{Sec}^{-1}(-2)$.

a. $\frac{2\pi}{3}$ b. $\frac{\pi}{3}$ c. $-\frac{\pi}{3}$ d. nonexistent

1. $\sin 150^\circ =$

a. $\sin 60^\circ$ b. $-\sin 60^\circ$ c. $-\sin 30^\circ$
d. $\sin 30^\circ$ e. none of these

2. Name the terminal side of the illustrated angle?



a. $\overrightarrow{AB}$ b. $\overrightarrow{OB}$ c. $\overrightarrow{OA}$ d. none of these

~~3.~~ How many revolutions does it take a wheel with a radius of 3 feet to travel a distance of 54π feet?

SKIP

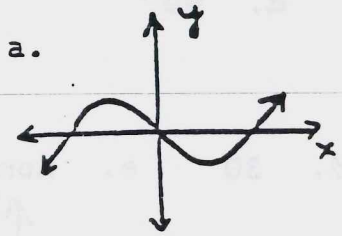
a. 4.5 b. 6 c. 9 d. 18

4. The value of $\sin 30^\circ - \cos 60^\circ + \cos 180^\circ + \sin 90^\circ$ is:

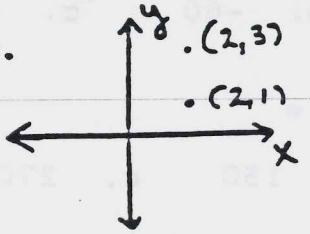
a. 2 b. 1 c. -1 d. 0

5. Which one of the following is the graph of a function?

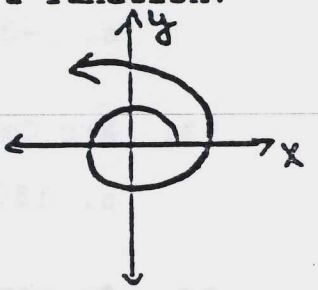
a.



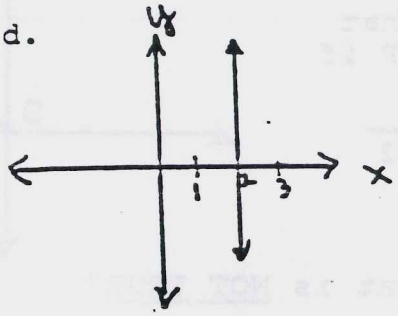
b.



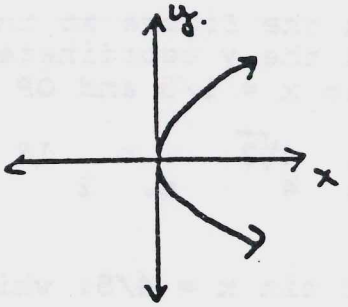
c.



d.



e.



6. What is the reference angle for 855° ?

a. 135° b. 45° c. 65° d. none of these

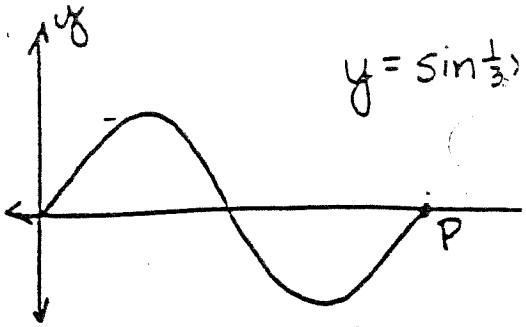
7. The period of $y = \cos 2x$ is:

a. π b. $\pi/2$ c. 2π d. 1 e. 4π

8. Which of the following is equal to $\cos 67^\circ$?

a. $\csc 23^\circ$ b. $\sec 23^\circ$ c. $\sin 23^\circ$
d. $\cos 23^\circ$ e. none of these

9. The figure at the right shows the graph of $y = \sin (1/3)x$. What is the value of x at point P?



a. 6π b. 3π c. $\pi/3$

d. $2\pi/3$ e. $3\pi/2$

10. If an angle is in standard position and the terminal side contains the ordered pair (3,3), the measure of the angle is:

a. 60° b. 22.5° c. 90° d. 45°

11. The maximum value of the function $y = 4 \sin 1000x$ is:

a. 1000 b. 4 c. $1000 (2\pi)$ d. 4000

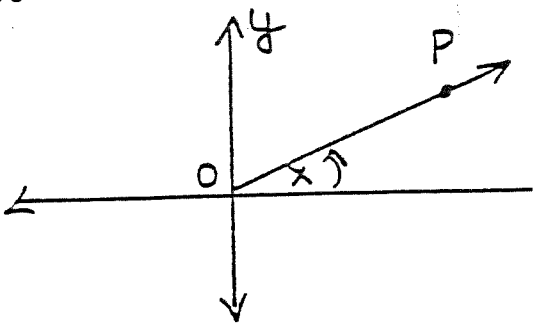
12. What is the reference angle for -300°?

a. -30° b. -60° c. 30° d. 60°

13. Arc Cos (-1) =

a. 180 b. 150 c. 270 d. 30 e. none of these

14. In the figure at the right, what is the y coordinate of point P if $\sin x = 1/3$ and OP = 6?



a. $4\sqrt{2}$ b. 18 c. $2\sqrt{2}$
d. 4 e. 2

15. If $\sin x = 4/5$, which statement is <u>NOT TRUE</u>?

a. $\tan x = 4/3$ b. $\cot x = 4/5$

c. $\csc x = 5/4$ e. $\cos x = 3/5$

16. What is the value of $\cos x$ if $\sin x = 1/4$?

a. $\sqrt{15}/4$ b. $3/4$ c. $1/\sqrt{17}$ d. $\sqrt{17}/4$ e. $1/\sqrt{15}$

17. If $\sin^2 60 + \sin x + \cos^2 60 = 0$, then one value of x is:

a. 0° b. 90° c. 180° d. 270° e. none of these

18. If x is an angle in standard position with a measure of -500° in what quadrant does its terminal side lie?

a. IV b. III c. I d. II

19. If $\cos 43^\circ 10' = 0.7294$ and $\cos 43^\circ 20' = 0.7274$, find $\cos 43^\circ 13'$ correct to four significant digits.

a. 0.7280 b. 0.6849 c. 0.6851 d. 0.7288

20. Which pair of angles are coterminal?

a. 225° and -135° b. 180° and 720°
c. 150° and -270° d. 135° and 420°

21. $\sin x = \cos(\ ?\ )$

a. $90 + x$ b. $180 - x$ c. $90 - x$ d. x

22. Which of these three statements are <u>NOT ALWAYS TRUE</u>?

I $\sin(-x) = \sin x$
II $\cos(-x) = \cos x$
III $\sec(-x) = \sec x$

a. I is not always true b. II is not always true
c. III is not always true
d. None of these is always true

23. Given ΔXYZ with $X=60^\circ$, $y=2$, and $z=4$. Find x.

a. $2\sqrt{7}$ b. $2\sqrt{3}$ c. $2\sqrt{6}$ d. $4\sqrt{7}$ e. $4\sqrt{3}$

24. If x is an angle in standard position such that the point (5,5) lies on its terminal side, $\sin x =$

a. 1 b. $2\sqrt{2}$ c. $\sqrt{2}/2$ d. 5

25. Given ΔABC with $A = 30^\circ$, $b=5$, and $c = 4$. The area of $\Delta ABC =$

Skip

a. 5/2 sq. units b. 10 sq. units
c. 2 sq. units d. 5 sq. units
e. not enough information is given to find the area

26. If x is an angle in standard position such that the point (0,6) is on its terminal ray, $\cos x =$

a. $\sqrt{3}/2$ b. $\sqrt{2}/2$ c. 0 d. 3/2

27. Solve for x:

$$\frac{x}{\sin \frac{\pi}{6}} = \frac{10}{\sin \frac{\pi}{4}}$$

a. 5 b. $5\sqrt{2}$ c. $5\sqrt{3}$ d. $10\sqrt{2}$

28. If x is an angle in standard position such that the point (-3,0) lies on its terminal side, tan x =

a. 0 b. -3 c. 1 d. -1

29. What is the fundamental period for the sine function?

a. $\pi/2$ b. 2π c. π d. 3π e. none of these

30. What is the measure of an angle whose sine is twice the sine of 30°?

a. 120° b. 240° c. 30° d. 90°

31. The angle of elevation of the sun is 74° from a point 15 feet from the base of a flagpole. Find the height of the flagpole to the nearest foot. (sin74=0.9613; cos74=0.2756; tan74=3.487)

a. 4 b. 14 c. 52 d. $15\sqrt{3}$

32. If x is a first quadrant angle with tan x = 3, cot x =

a. $3/\sqrt{10}$ b. $\sqrt{10}/3$ c. 2/3 d. none of these

33. What is the maximum value of y = tan x?

a. 0 b. 1000 c. 1 d. there is no maximum value

34. If x is a first quadrant angle with sin x = 24/25, tan x =

a. 25/7 b. 25/24 c. 24/7 d. none of these

35. Which one of the following has no triangle solution?

Skip

a. $A = 30^\circ$, b = 20, a = 9 b. $A = 30^\circ$, b = 20, $B = 70^\circ$

c. $A = 30^\circ$, b = 20, a = 11 d. $A = 30^\circ$, b = 20, c = 25

36. Which of these statements is false?

I. $\cos 45^\circ - \sin 45^\circ = 0$

II. $\cos^2 30^\circ + \sin^2 30^\circ = 1$

III. $\cos 45^\circ + \sin 45^\circ = 1$

a. Only I is false
b. Only I and II are false
c. Only II is false
d. Only III is false
e. All three statements are false

37. If the domain of the function $f = \{(x,y): y = 2x + 3\}$ is $D = \{-1,0,1\}$ then the range R of f is:

a. $\{-1,0,1\}$
b. $\{1,3,5\}$
c. {all real numbers}
d. {odd integers}
e. {nonnegative real numbers}

38. What is the area of right triangle ABC if $A = 30^\circ$, $C = 90^\circ$, and $a=2$?

a. 4
b. 2
c. $4\sqrt{2}$
d. $2\sqrt{3}$

39. Solve $\sin^2 x - \sin x = 0$ for x if $0 \le x \le 2\pi$.

a. $\emptyset$
b. $\{\pi/2\}$
c. $\{0, \pi/2, \pi\}$
d. $\{\pi/2, 3\pi/2\}$

40. If $\sin 52^\circ = 0.7880$, find $\sin 232^\circ$.

a. 0.7880
b. 0.2120
c. -0.2120
d. none of these

41. Given ΔABC with $a = 2$, $b = 3$, and $c = 4$. Find $\cos A$.

SKIP

a. 1/4
b. ~~3/4~~
c. 11/16
d. -1/4
e. 7/8

42. Another name for $1 + \tan^2 x$ is:

a. $\sin^2 x$
b. $\cos^2 x$
c. $\sec^2 x$
d. $\cot^2 x$
e. none of these

43. If $\tan x = -1$, one value of x is:

a. 135°
b. 45°
c. 180°
d. 120°

52. The radian measure for 105° is:

a. $7\pi/24$ b. $7\pi/48$ c. $7\pi/12$
d. none of these

53. $\sin(11\pi/3) =$

a. $-\sqrt{3}/2$ b. $(1-\sqrt{3})/2$ c. $\sqrt{3}/2$ d. none of these

54. If $\cos\theta = 5/13$ and $\sin\alpha = 12/13$, and θ and α are first quadrant angles, then $\sin(\theta+\alpha) =$

a. 26/17 b. 13/17 c. 17/13 d. 17/26 e. 120/169

55. An incline makes an angle of 45° with the level ground. How many feet up the incline must one go in order to rise 10 feet above ground?

a. $10\sqrt{2}$ b. $\sqrt{2}/10$ c. 20 d. 10 e. $10/\sqrt{2}$

56. Given ΔABC with $B = 30$, $b = 3$, and $a = 2$. $\sin A =$

a. $3/\sqrt{13}$ b. 1/3 c. 3/2 d. 2/3
e. none of these

57. If $\sin 14^\circ = 0.24$, then $\sin 28^\circ =$

a. $2\sin 14^\circ \cos 14^\circ$ b. $\sin 14^\circ + \cos 14^\circ$
c. 0.48 d. $2\sin 14^\circ$

58. Which of the following is a formula for the area of triangle ABC?

SKIP

a. $ab\sin C$ b. $ab\cos C$
c. $(1/2)(ab)\sin C$ d. none of these

59. Convert 3 radians to degrees.

a. $3(180/\pi)$ b. $3(\pi/180)$
c. $3(180\pi)$ d. 3π

~~60~~. The positive angles less than 360° represented by arc tan (-1) are:

SKIP

a. $235^\circ, 315^\circ$ b. $135^\circ, 315^\circ$ c. $135^\circ, 235^\circ$ d. $35^\circ, 135^\circ$

Use a #2 pencil and fill in the correct circle on your answer sheet.

Write the letter of the response that best answers each question.

1. Find the distance between $P(1, -3)$ and $Q(-2, 5)$. (Section 1-1)

   a. $\sqrt{5}$ b. 5 c. 73 d. $\sqrt{73}$

2. The domain of a function is $\{-2, -1, 0, 1, 2\}$. The function is described by the equation $y = 3x - 2$. Find the range of the function. (Section 1-1)

   a. $\{-2, 1, 4\}$ b. $\{-4, -2, -1, 1, 4\}$
   c. $\{-8, -5, -2, 1, 4\}$ d. $\{-8, -5, -2, 5, 8\}$

3. Find, in degrees, the measure of a $\frac{3}{4}$ counterclockwise rotation. (Section 1-2)

   a. 135° b. 270° c. −135° d. −270°

4. Point $P(x, y)$ is on the terminal side of an angle with measure θ in standard position. P is located r units from the origin. Tell which statement is false. (Sections 1-3 and 1-4)

   a. $\sin\theta = \frac{y}{r}$ b. $\cos\theta = \frac{x}{r}$ c. $\cot\theta = \frac{x}{y}$ d. $\sec\theta = \frac{r}{y}$

5. Find the value of $\tan 30°$. (Section 1-5)

   a. $\frac{\sqrt{3}}{3}$ b. $\sqrt{3}$ c. $\frac{\sqrt{3}}{2}$ d. 2

6. Find the value of $\cos 225°$. (Section 1-5)

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

7. Tell which angle is coterminal with 172°. (Section 1-6)

   a. 18° b. −172° c. 432° d. −188°

8. Given that $\sin 13° = .2250$, find $\sin 193°$. (Section 1-6)

   a. .9744 b. −.2250 c. .2250 d. −.9744

9. Tell which equality is false. (Section 2-4)

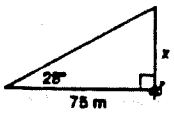
   a. $\sin(-\theta) = \sin(180° + \theta)$ b. $\cos(2\pi - \theta) = \cos(-\theta)$
   c. $\cos(180° + \theta) = \cos(360° - \theta)$ d. $\sin(-\theta) = \sin(360° - \theta)$

10. Tell which number you multiply by in order to change 213° to radian measure. (Section 2-1)

    a. 2π b. π c. $\frac{180}{\pi}$ d. $\frac{\pi}{180}$

11. Refer to the figure at the right. Then find the value of x to the nearest meter. (Section 1-8)

    a. 39 m b. 39.5 m
    c. 40 m d. 40.5 m

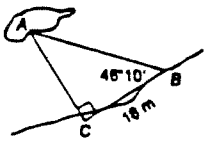


12. The angle of depression from the top of a cliff 600 meters high to the foundation of a house is 33°40′. To the nearest meter, how far is the house from the foot of the cliff? (Section 1-9)

    a. 901 b. 400 c. 333 d. 499

13. To find the distance from point C on the shore to point A on Maple Island, a surveyor made the measurements shown in the figure at the right. Find the distance AC to the nearest tenth of a meter. (Section 1-10)

    a. 17.9 b. 17.3 c. 18.1 d. 18.7



14. Given that $\sin 73° = .96$, $\cos 73° = .29$, $\sin 41° = .66$, and $\cos 41° = .75$, evaluate $\cos 32°$. (Section 3-3)

    a. −.85 b. −.42 c. .42 d. .85

15. Evaluate $\sin 75°$ without tables. (Section 3-4)

    a. $\frac{\sqrt{2}}{4}(\sqrt{3} - 1)$ b. $\frac{\sqrt{2}}{4}(\sqrt{3} + 1)$ c. $\frac{\sqrt{3}}{4}(\sqrt{2} - 1)$ d. $\frac{\sqrt{3}}{4}(\sqrt{2} + 1)$

Given that $\sin\alpha = .42$ and $\cos\alpha = .91$, evaluate $\sin 2\alpha$. (Section 3-6)

a. .76 b. −.76 c. .38 d. −.38

17. Find the equality that is not an identity.

a. $1 = \csc^2\theta - \cot^2\theta$ b. $\cot\theta = \frac{\cos\theta}{\sin\theta}$

c. $\tan^2\theta - \sec^2\theta = 1$ d. $\sin\theta = \frac{1}{\csc\theta}$

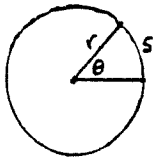
18. Find the equality that is an identity. (Section 3–2)

a. $\sin^2\theta = \frac{\sec^2\theta - 1}{\sec\theta}$ b. $\frac{\csc\theta}{\sin\theta} = \cot^2\theta + 1$

c. $\sec\theta = \sin\theta \cdot \tan\theta$ d. $\sin\theta \cdot \sec\theta = 1$

19. Evaluate cos 15° without tables. (Section 3–3)

a. $\frac{\sqrt{3}}{2}(\sqrt{3}+1)$ b. $\frac{\sqrt{3}}{2}(\sqrt{2}-1)$ c. $\frac{\sqrt{3}}{4}(\sqrt{2}+1)$ d. $\frac{\sqrt{3}}{4}(\sqrt{3}+1)$



Questions 20–22 refer to the diagram at the left.

20. If $r = 10$ m and $s = 12$ m, find the radian measure of θ.

(a) 0.8 (b) 1.2 (c) 120 (d) $\frac{6\pi}{5}$

21. If $s = 10$ m and $\theta = \frac{\pi}{5}$, find r.

(a) $\frac{50}{\pi}$ m (b) 2π m (c) $\frac{\pi}{50}$ m (d) 50 m

22. If $\theta = 40°$ and $r = 18$ cm, find s.

(a) 720 cm (b) $2\frac{2}{9}$ cm (c) 4π cm (d) 4 cm.

23. Change $\frac{5\pi}{9}$ to degrees.

(a) 50° (b) 100° (c) 200° (d) 225°

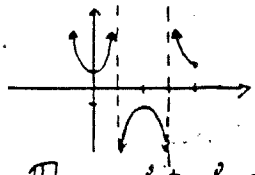
SKIP ~~24~~. Change 42°20′ to radians.

(a) $\frac{127\pi}{180}$ (b) $\frac{127\pi}{540}$ (c) $\frac{127\pi}{270}$ (d) $\frac{127\pi}{90}$

25. The distance r from the origin to a point P on the terminal side of an angle in standard position is the:

(a) measure of the angle (b) radius vector (c) rotation (d) reciprocal.

26. An angle is Quadrant III whose reference angle is 21° 37′ is (a) 201°37′ (b) 158°23′ (c) 248°23′ (d) 158°37′.

27. 

This is the graph of

(a) $y = \csc x$ (b) $y = \sec x$ (c) $y = \tan x$ (d) $y = \cot x$

28. The amplitude of the function $y = -2\sin\frac{1}{2}x + 1$ is

(a) -2 (b) $\frac{1}{2}$ (c) 1 (d) 2

29 The period of $y = -2\sin\frac{1}{2}x + 1$ is

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) 4π

SKIP ~~30~~ The frequency of $y = -2\sin\frac{1}{2}x + 1$ is

(a) $\frac{1}{2}$ (b) 1 (c) 2 (d) 4

Name: _____ Date: _____

Period: _____ Trig Final Exam Review Solutions

1. D
2. B
3. C
4. A
5. B
6. A
7. D
8. D
9. B
10. A
11. A
12. B
13. D
14. A
15. C
16. D
~~17.~~ B
18. D
19. C
20. B
21. B
22. B
23. C
24. B
25. A
26. A
27. B
28. A
29. B
30. B
31. D
32. C
~~33.~~ A
~~34.~~ C
~~35.~~ A
~~36.~~ A
~~37.~~ C
45. B
46. D
47. C
48. D
~~49.~~ C
~~50.~~ A

~~51.~~ E
52. H
53. D
54. G
~~55.~~ J
56. F
57. C
~~58.~~ B
59. A
~~60.~~ I
61. F
62. T
63. F
64. T
65. F
66. F
~~67.~~ T
68. F
69. T
70. F
1. D
2. A
3. C
4. B
5. C
6. D
7. A
8. C
9. D
10. C
11. A
~~12.~~ B
~~13.~~ D
14. D
15. A
16. C
17. A
18. B
~~19.~~ A
20. A
1. D
2. C
~~3.~~ C

~~33.~~ C
~~34.~~ B

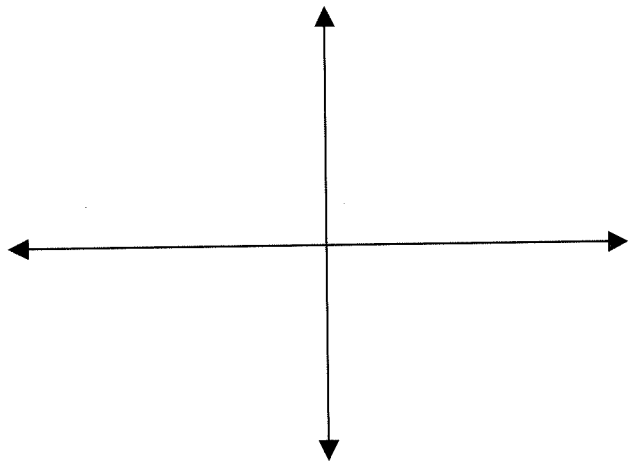
4. D
5. A
6. B
7. A
8. C
9. A
10. D
11. B
12. D
13. A
14. E
15. B
16. A
17. D
18. B
19. D
20. A
21. C
22. A
23. B
24. C
~~25.~~ D
26. C
27. B
28. A
29. B
30. D
31. C
32. D
33. D
34. C
~~35.~~ A
36. D
37. B
38. D
39. C
40. D
~~41.~~ E
42. C
43. A
52. C
53. A
54. E

55. A
56. B
57. A
~~58.~~ C
59. A
~~60.~~ B
1. D
2. C
3. B
4. D
5. A
6. B
7. D
8. B
9. C
10. D
11. C
12. A
13. D
14. D
15. B
16. B
17. C
18. B
19. D
20. B
21. A
22. C
23. B
~~24.~~ B
25. B
26. A
27. B
28. D
29. D
~~30.~~ $1/4\pi$

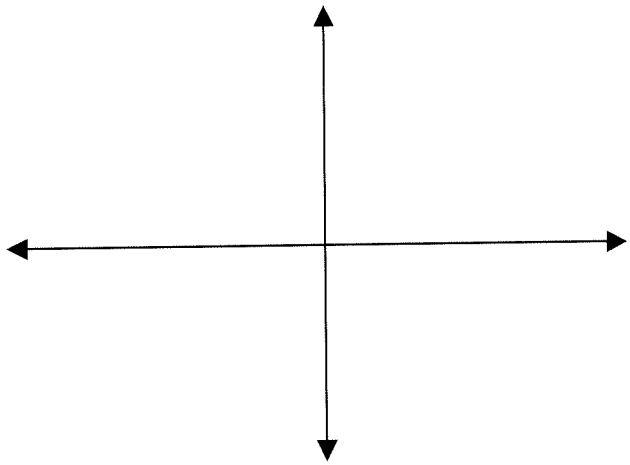
Name:_____ Date: _____

Period: _____ ***Inverse Trig Functions*** Trigonometry: Final Exam Review

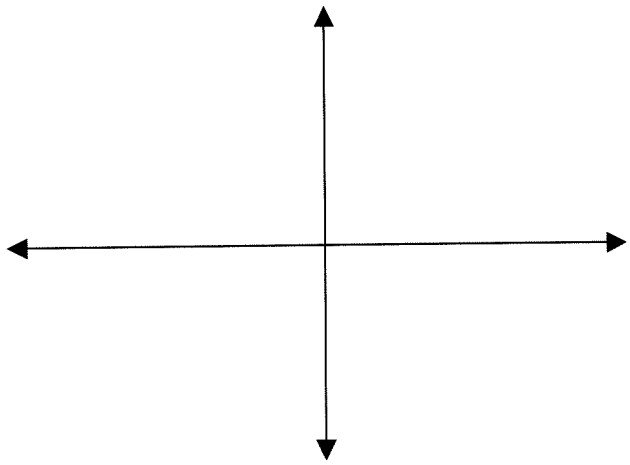
1. Draw $y = \sin^{-1} x$.
   a. The domain for $y = \sin^{-1} x$ is _____.
   b. The range for $y = \sin^{-1} x$ is _____.
   c. $y = \sin^{-1} x$ is located in quadrants _____ and _____.
   d. $y = \sin^{-1} x$ is positive in quadrant _____.
   e. $y = \sin^{-1} x$ is negative in quadrant _____.



2. Draw $y = \cos^{-1} x$.
   a. The domain for $y = \cos^{-1} x$ is _____.
   b. The range for $y = \cos^{-1} x$ is _____.
   c. $y = \cos^{-1} x$ is located in quadrants _____ and _____.
   d. $y = \cos^{-1} x$ is positive in quadrant _____.
   e. $y = \cos^{-1} x$ is negative in quadrant _____.



3. Draw $y = \tan^{-1} x$.
   a. The domain for $y = \tan^{-1} x$ is _____.
   b. The range for $y = \tan^{-1} x$ is _____.
   c. $y = \tan^{-1} x$ is located in quadrants _____ and _____.
   d. $y = \tan^{-1} x$ is positive in quadrant _____.
   e. $y = \tan^{-1} x$ is negative in quadrant _____.



Directions: Write the solutions to the following expressions in radians if the answer is an angle and a fraction if the answer is a ratio!

a. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

b. $\sin^{-1}\left(-\frac{1}{2}\right)$

c. $\arcsin(-1)$

d. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

e. $\arccos(0)$

f. $\arctan(-1)$

g. $\tan^{-1}(0)$

h. $\arcsin\left(-\frac{\sqrt{2}}{2}\right)$

i. $\arccos(-1)$

j. $\tan\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$

k. $\sin\left(\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$

l. $\cos\left(\arctan\left(-\sqrt{3}\right)\right)$