

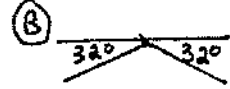
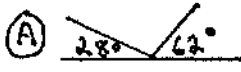
Trigonometry - Angles and Ratios Lesson #7: Practice Test

The first nine questions of this test should be done without using a calculator.

1. Which of the following pairs of angles in standard position have the same reference angle?

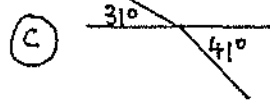
A. 62° and 152°

B. 212° and 328°



C. 149° and 319°

D. 71° and 19°



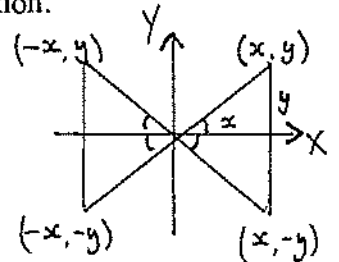
2. The point (x, y) is on the terminal arm of an angle θ° in standard position. Which of the following statements must be correct?

A. The point (y, x) is on the terminal arm of angle θ° .

B. The point $(x, -y)$ is on the terminal arm of angle $(180 - \theta)^\circ$.

C. The point $(-x, -y)$ is on the terminal arm of angle $(180 + \theta)^\circ$.

D. The point $(-x, y)$ is on the terminal arm of angle $(360 - \theta)^\circ$.



3. In which quadrant is the sine ratio of an angle negative and the tangent ratio of the angle also negative?

A. 4

B. 3

C. 2

D. 1

S	A
T	C

4. The terminal arm of angle θ in standard position passes through the point $(8, -6)$. The exact value of $\sin \theta$ is

A. 0.6

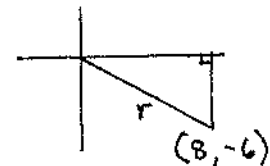
B. -0.6

C. 0.8

D. -0.8

$$\begin{aligned} x &= 8 & r^2 &= x^2 + y^2 \\ y &= -6 & r^2 &= (8)^2 + (-6)^2 = 100 \\ & & r &= 10 \end{aligned}$$

$$\sin \theta = \frac{y}{r} = \frac{-6}{10} = -0.6$$



5. Which of the following statements is true?

A. $\cos 165^\circ = \cos 15^\circ$

ref. $\angle = 15^\circ$

$$\cos 165^\circ = -\cos 15^\circ$$

B. $\sin 287^\circ = -\sin 17^\circ$

ref. $\angle = 73^\circ$

$$\sin 287^\circ = -\sin 73^\circ$$

C. $\tan 156^\circ = -\tan 24^\circ$

ref. $\angle = 24^\circ$

$$\tan 156^\circ = -\tan 24^\circ$$

D. $\sin 200^\circ = \sin 20^\circ$

ref. $\angle = 20^\circ$

$$\sin 200^\circ = -\sin 20^\circ$$

6. Determine the exact value of $\cos 210^\circ$.

A. $-\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{3}}{2}$

reference angle = 30°

$$\cos 210^\circ = -\cos 30^\circ = -\frac{\sqrt{3}}{2}$$

C. $-\frac{1}{2}$

D. $\frac{1}{2}$

7. Angle A terminates in the fourth quadrant with $\cos A = \frac{4}{5}$. The exact value of $\tan A$ is

A. $\frac{4}{3}$

B. $\frac{3}{4}$

C. $-\frac{4}{3}$

D. $-\frac{3}{4}$

$$\cos A = \frac{4}{5} = \frac{x}{r}$$

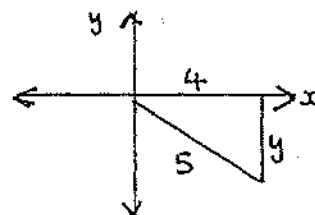
$$\text{let } x = 4, r = 5$$

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

$$4^2 + y^2 = 5^2$$

$$16 + y^2 = 25$$

$$y^2 = 9 \quad y = -3 \text{ in quadrant 4}$$



$$\tan A = \frac{y}{x} = -\frac{3}{4}$$

8. The largest solution to the equation $\tan \theta + 1 = 0$, $0^\circ \leq \theta \leq 360^\circ$, is $\theta = x^\circ$. The value of x is

A. 45°

B. 135°

C. 225°

D. 315°

$$\tan \theta = -1$$

quadrants 2/4

largest value in quadrant 4

$$\text{ref. angle} = 45^\circ$$

$$x = 360 - 45$$

$$= 315^\circ$$

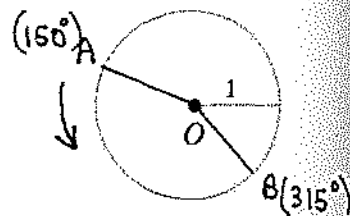
Numerical Response 1.

The diagram shows an initial arm of length 1 unit being rotated counterclockwise about the origin to form a circle of radius 1.

Two points on the circumference of the circle are $A\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

and $B\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$. Rotating counterclockwise from A to B , the measure of angle AOB in degrees is _____.

(Record your answer in the numerical response box from left to right.)



1	6	5	
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$$315^\circ - 150^\circ = 165^\circ$$

A calculator is allowed for the remaining questions in this test.

9. A rotation angle of -500° terminates in quadrant

- A. one B. two $-500^\circ + 2(360^\circ) = 220^\circ$
 (C) three D. four quadrant 3

10. How many of the following pairs of angles are coterminal angles?

- | | | | |
|-------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| I. 50° and -50° | II. 90° and -90° | III. 180° and -180° | IV. 360° and -360° |
| A. one pair ^{no} | ^{no} | $-180^\circ + 360^\circ$ | $-360^\circ + 2(360^\circ)$ |
| (B) two pairs | | $= 180^\circ$ | $= 360^\circ$ |
| C. three pairs | | yes | yes |
| D. four pairs | | | |

11. Solve: $\sin A = -0.8290$, $0^\circ \leq A \leq 360^\circ$

- A. 56° quad. 3/4
 B. $56^\circ, 124^\circ$ ref. angle = 56°
 C. $124^\circ, 236^\circ$ $\angle A = 180^\circ + 56^\circ$ or $360^\circ - 56^\circ$
 (D) $236^\circ, 304^\circ$ $\angle A = 236^\circ, 304^\circ$

Numerical Response

2. To the nearest degree, the solution to the equation $\cos x = -0.2079$, where $0^\circ \leq x \leq 180^\circ$, is _____.

(Record your answer in the numerical response box from left to right.)

1	0	2	
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quadrant 2 $x = 180^\circ - 78^\circ$
 ref. angle = 78° $= 102^\circ$

Numerical Response

3. To the nearest degree, the solution to the equation $\tan a = -0.5$, where $360^\circ \leq a \leq 540^\circ$, is _____.

(Record your answer in the numerical response box from left to right.)

5	1	3	
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solve for $0^\circ \leq a \leq 180^\circ$

quadrant 2 $a = 180^\circ - 27^\circ = 153^\circ$
 ref. angle = 27°

solve for $360^\circ \leq a \leq 540^\circ$. $a = 153^\circ + 360^\circ = 513^\circ$

Numerical
Response

4. The smallest positive root of the equation $2\sin x^\circ + 1 = 0$ is $x =$ _____
(Record your answer in the numerical response box from left to right.)

2	1	0	
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$$2\sin x^\circ = -1$$

$$\sin x^\circ = -\frac{1}{2}$$

smallest positive root in
quadrant 3

$$\text{reference angle} = 30^\circ$$

$$x = 180^\circ + 30^\circ = 210^\circ$$

12. If $\sin \theta = -\frac{1}{2}$, and $270^\circ \leq \theta \leq 360^\circ$, then the value of $\cos \theta$ is

A. $-\frac{1}{2}$

B. $-\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

$$\text{reference angle} = 30^\circ$$

$$\theta = 360^\circ - 30^\circ = 330^\circ$$

$$\cos 330^\circ = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

13. If $\cos \theta = \frac{1}{2}$ and $270^\circ \leq \theta \leq 360^\circ$, then the value of $\sin \theta$ is

A. $-\frac{\sqrt{3}}{2}$

B. $-\frac{1}{2}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

$$\text{reference angle} = 60^\circ$$

$$\theta = 360^\circ - 60^\circ = 300^\circ$$

$$\sin 300^\circ = -\sin 60^\circ = -\frac{\sqrt{3}}{2}$$

14. The point (4, 6) lies on the terminal arm of an angle A in standard position. The exact value of $\cos A$ is

A. $\frac{1}{\sqrt{13}}$

B. $\frac{2}{\sqrt{13}}$

C. $\frac{3}{\sqrt{13}}$

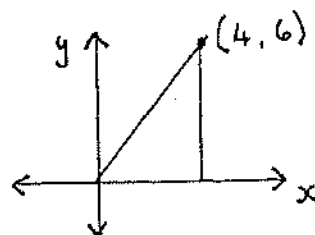
D. $\frac{3}{\sqrt{26}}$

$$x = 4, y = 6$$

$$r^2 = x^2 + y^2 = 4^2 + 6^2 = 52$$

$$r = \sqrt{52} = \sqrt{4} \sqrt{13} = 2\sqrt{13}$$

$$\cos A = \frac{x}{r} = \frac{4}{2\sqrt{13}} = \frac{2}{\sqrt{13}}$$



15. The point on the unit circle that corresponds to a rotation of 300° is

A. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

B. $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

C. $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

D. $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

$$(\cos 300^\circ, \sin 300^\circ)$$

$$= (\cos 60^\circ, -\sin 60^\circ)$$

$$= \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$$

Numerical Response 5.

The point $A(-0.8910, 0.4540)$ lies on the unit circle. Let θ represent the positive rotation angle in standard position from the x -axis to the line passing through A . To the nearest degree, the value of θ is _____.

(Record your answer in the numerical response box from left to right.)

1	5	3	
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$$\cos \theta = -0.8910 \text{ in quadrant 2}$$

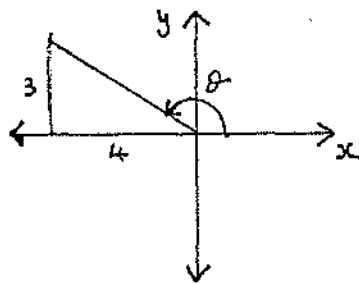
$$\text{reference angle} = 27^\circ$$

$$\theta = 180^\circ - 27^\circ = 153^\circ$$

Written Response 5 marks

Consider angle θ where $\tan \theta = -\frac{3}{4}$ and $\cos \theta$ is negative.

- In which quadrant does the terminal arm of θ lie? quadrant 2
- Make a sketch of the angle θ in standard position and determine the exact value of $\sin \theta$.



$$\tan \theta = -\frac{3}{4} = \frac{y}{x}$$

let $y = 3$ and $x = -4$

$$\begin{aligned} r^2 &= x^2 + y^2 \\ &= (-4)^2 + (3)^2 \\ &= 25 \end{aligned}$$

$$\sin \theta = \frac{y}{r} = \underline{\underline{\frac{3}{5}}}$$

$$r = 5$$

- Determine, to the nearest degree, the value of θ where $0^\circ \leq \theta \leq 360^\circ$.

$$\tan \theta = -\frac{3}{4} \text{ in quad. 2}$$

$$\text{ref. } \angle = 37^\circ$$

$$\theta = 180^\circ - 37^\circ = \underline{\underline{143^\circ}}$$

- To the nearest degree, state two angles which are coterminal with angle θ .

$$143^\circ - 360^\circ = \underline{\underline{-217^\circ}}$$

$$143^\circ + 360^\circ = \underline{\underline{503^\circ}}$$

Answer Key

1. B 2. C 3. A 4. B 5. C 6. A 7. D 8. D
 9. C 10. B 11. D 12. D 13. A 14. B 15. C

Numerical Response

1.

1	6	5	
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2.

1	0	2	
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3.

5	1	3	
---	---	---	--

4.

2	1	0	
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5.

1	5	3	
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Written Response

- Quadrant 2 • $\frac{3}{5}$ • 143° • $-217^\circ, 503^\circ$ (answers may vary)