

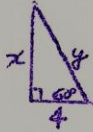
TRIGONOMETRY FINAL B POST TEST

NAME _____

SEMINOLE COUNTY TEACHER EDUCATION CENTER

Show all work as necessary on this test or separate paper.
 Calculators } are allowed. DO ANY 10 PROBLEMS.
 Blue Sheets }

1. Find the exact value of x and y :



2. Evaluate (give exact values)

a) $\cos^{-1}\left(\sin \frac{\pi}{6}\right) =$

b) $\sin\left(\cos^{-1} \frac{5}{13}\right) =$

c) $\sin^{-1}\left(\cos \frac{2\pi}{3}\right) =$

3. A wheel is of radius 10cm. and it turns at 20 revolutions per minute. Find the linear velocity of a point on the outside edge of the wheel, in cm per minute.

4. The terminal side of an angle in standard position passes through $(-8, 6)$. Find the six trigonometric functions of the angle.

5. Prove the identity:

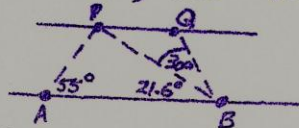
$$\cos 4x = 8 \cos^4 x - 8 \cos^2 x + 1$$

Hint: $\cos(2x + 2x)$.

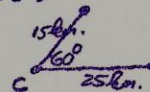
6. Solve for x : $0 \leq x < 2\pi$

$$1 + \cos x = 4 \sin^2 x$$

7. Points P and Q on the far bank of a river are sighted from points A and B on the near side. If the banks are parallel as shown, and if $AB = 25\text{ m}$, find PQ.



8. Two ships are moving from port at C at the same time with a 60° angle between them. At the end of an hour one has traveled 25 km, the other 15 km. How far apart are the ships?



9. Graph: $y = 3 \cos\left(2x + \frac{\pi}{2}\right)$ for $0 \leq x \leq 2\pi$

10. Use theorem of De Moivre to simplify: $(1+i)^{10}$

11. Find the sixth roots of unity.

TRIGONOMETRY

POST TEST

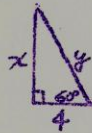
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SEMINOLE COUNTY TEACHER EDUCATION CENTER

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Calculators } are allowed. Do ANY 10 PROBLEMS.
Blue Sheets }

1. Find the exact value of x and y :



$$x = 4\sqrt{3}$$

$$y = 8$$

2. Evaluate (give exact values)

a) $\cos^{-1}\left(\sin \frac{\pi}{6}\right) = \frac{\pi}{3}$

b) $\sin\left(\cos^{-1}\frac{5}{13}\right) = \frac{12}{13}$

c) $\sin^{-1}\left(\cos \frac{2\pi}{3}\right) = -\frac{\pi}{6}$

3. A wheel is of radius 10cm. and it turns at 20 revolutions per minute. Find the linear velocity of a point on the outside edge of the wheel, in cm per minute.

$$v = rw$$

$$= 10 \cdot 20 \frac{\text{Rev.}}{\text{min}} \cdot \frac{2\pi \text{ rad}}{1 \text{ Rev.}}$$

$$= 200\pi \text{ cm/min.}$$

4. The terminal side of an angle in standard position passes through $(-8, 6)$. Find the six trigonometric functions of the angle.

$$\sin \alpha = \frac{3}{5} \quad \csc \alpha = \frac{5}{3}$$

$$\cos \alpha = -\frac{4}{5} \quad \sec \alpha = -\frac{5}{4}$$

$$\tan \alpha = -\frac{3}{4} \quad \cot \alpha = -\frac{4}{3}$$

5. Prove the identity:

$$\cos 4x = 8\cos^4 x - 8\cos^2 x + 1$$

Hint: $\cos(2x + 2x) = 2\cos^2 2x - 1$

$$= 2(2\cos^2 x - 1)^2 - 1$$

$$= 2(4\cos^4 x - 4\cos^2 x + 1) - 1$$

$$= 8\cos^4 x - 8\cos^2 x + 1$$

6. Solve for x : $0 \leq x < 2\pi$

$$1 + \cos x = 4\sin^2 x$$

$$1 + \cos x = 4(1 - \cos^2 x)$$

$$1 + \cos x = 4 - 4\cos^2 x$$

$$4\cos^2 x + \cos x - 3 = 0$$

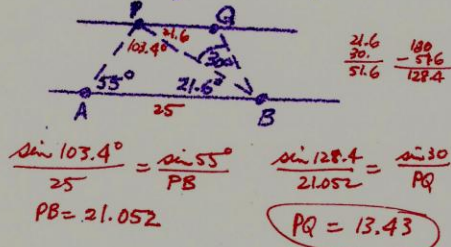
$$(4\cos x - 3)(\cos x + 1) = 0$$

$$\cos x = \frac{3}{4} \quad \cos x = -1$$

$$x = 41.4^\circ \quad x = 180^\circ$$

$$318.6$$

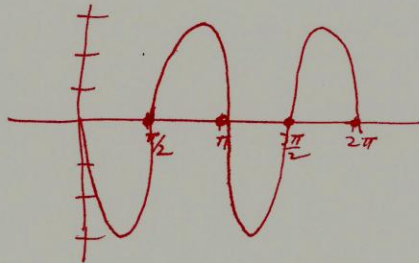
7. Points P and Q on the far bank of a river are sighted from points A and B on the near side. If the banks are parallel as shown, and if $AB = 25\text{m}$, find PQ.



$$\frac{\sin 103.4^\circ}{25} = \frac{\sin 55^\circ}{PB} \quad \frac{\sin 128.4^\circ}{21.052} = \frac{\sin 30^\circ}{PQ}$$

$PB = 21.052$ $PQ = 13.43$

9. Graph: $y = 3 \cos(2x + \frac{\pi}{2})$ for $0 \leq x \leq 2\pi$



11. Find the sixth roots of unity.

$$z = \cos\left(\frac{0+2k\pi}{6}\right) + i \sin\left(\frac{0+2k\pi}{6}\right)$$

$$z_0 = \cos 0 + i \sin 0$$

$$z_1 = \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} = \frac{1}{2} + i \frac{\sqrt{3}}{2}$$

$$z_2 = \cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3} = -\frac{1}{2} + i \frac{\sqrt{3}}{2}$$

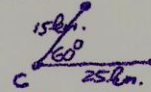
$$z_3 = \cos \pi + i \sin \pi = -1 + 0i$$

$$z_4 = \cos \frac{4\pi}{3} + i \sin \frac{4\pi}{3} = -\frac{1}{2} - i \frac{\sqrt{3}}{2}$$

$$z_5 = \cos \frac{5\pi}{3} + i \sin \frac{5\pi}{3} = \frac{1}{2} - i \frac{\sqrt{3}}{2}$$

$$z_6 = \cos 2\pi + i \sin 2\pi = 1$$

8. Two ships are moving from port at C at the same time with a 60° angle between them. At the end of an hour one has traveled 25 km, the other 15 km. How far apart are the ships?



$$C^2 = 15^2 + 25^2 - 2 \cdot 15 \cdot 25 \cdot \cos 60^\circ$$

$$= 475$$

$$C = \sqrt{475}$$

$$= 21.8 \text{ km}$$

10. Use theorem of De Moivre to simplify: $(1+i)^{10}$

$$r = \sqrt{2}$$

$$\theta = 45^\circ$$

$$z^n = (\sqrt{2})^{10} [\cos 450 + i \sin 450]$$

$$= 32 [\cos 90 + i \sin 90]$$

$$= 32i$$

12. $A_{\text{max}} = 3$

$$\text{Period} = \pi$$

$$P.S. = \frac{\pi}{4} \text{ Left.}$$

$$\text{Freq} = \frac{1}{\pi}$$