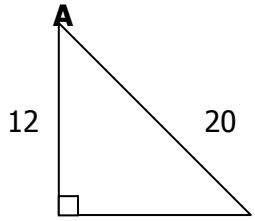
National MAθ Convention 2002
Hustle.....Trigonometry

1 Find $\cos A$.



Answer: 0.6 or $\frac{3}{5}$

2 Reduce to a single trig function:

$$\frac{\cos\theta \ \sin 2\theta}{1+\cos 2\theta}$$

Answer: $\sin\theta$

3 Evaluate:

$$2\sin\frac{8\pi}{3}-2\cos\frac{4\pi}{3}+2\sin\frac{4\pi}{3}$$

Answer: 1

4 Solve for $x,\ 0\le x<2\pi$:

$$\sin 2x = 2\cos x$$

Answer: $\frac{\pi}{2},\frac{3\pi}{2}$

5 Evaluate: $\tan\left(\arcsin\frac{6}{7}\right)$

Answer: $\frac{6}{\sqrt{13}}$ or 1.664

6 The angle of depression of an aircraft carrier from an approaching airplane is 53.2°. If the plane is 800 ft above the level of the deck of the carrier, how far away is the carrier?

Answer: $\approx 999\ ft$

7 Express in rectangular form:

$$6\left(\cos 135^\circ + i\sin 135^\circ\right)$$

Answer: $-3\sqrt{2}+3i\sqrt{2}$

8 Write $\frac{\cot\theta}{\cos\theta}$ in terms of $\sin\theta$.

Answer: $\frac{1}{\sin\theta}$

9 Solve for θ where $0^\circ \le \theta < 360^\circ$

$$2\sin^2\theta+\sin\theta-1=0$$

Answer: $30^\circ, 150^\circ, 270^\circ$

10 A tsunami (tidal wave) can be modeled by the equation

$d = 9-19\sin\left[\left(\frac{2\pi}{15}\right)t\right]$, d = depth in m and t = time in minutes. Determine the depth of the water 2 minutes after the tsunami strikes.

Answer: 5.120 m

11 Which quadrant has the terminal side of an angle measuring 162° ?

Answer: Q II

12 If the angular speed of a 10" diameter grindstone is 1800 rpm, calculate the linear speed of a point on the rim of the grindstone in ft/sec.

Answer: 78.540 ft/sec

#13 Convert -210° to exact radian measure.

Answer: $-\frac{7\pi}{6}$

14 Determine the period for $y = 3 + 2\sin(5x - \pi)$

Answer: $\frac{2\pi}{5}$

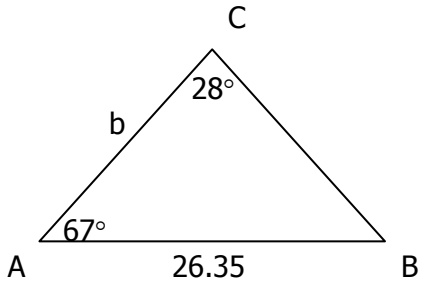
15 A central angle of 42 degrees is inscribed in a circle of radius 18 cm. Determine the radian measure for the length of the intercepted arc.

Answer: 13.195 cm

16 Find the value of $\cos\theta$ if $\tan\theta = -\frac{4}{3}$ and $\sin\theta$ is negative.

Answer: $\frac{3}{5}$

17 Find the measure of side b given:

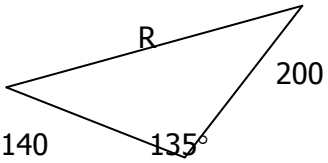


Answer: 55.913

18 One leg of a right triangle is 30 cm long. The adjacent angle to this leg is 50°. Determine the length of the hypotenuse.

Answer: 46.672 cm

19 Given the information indicated in the diagram, find the length of R.



Answer: 314.957 or 315

20 Which of the following is **NOT** true?

a) $\tan\theta = 10^6$
b) $\cos\theta = 0.01$
c) $\cos\theta = positive, \tan\theta = negative$
d) $\sin\theta = 1.500$

Answer: d

21 In which quadrant would one find the terminal side of an angle of measure $\frac{11}{3}\pi$ in standard position?

Answer: Q IV

22 What is the phase shift for: $y = 5\cos(6x - \pi)$?

Answer: $\frac{\pi}{6}$

23 Find $\sec(\arccos\frac{3}{4})$.

Answer: $\frac{4}{3}$

24 Find the value for $\cos 2\theta$, if θ is in quadrant I and $\cos\theta = \frac{60}{61}$.

Answer: - 0.935

25 Simplify to an exact value : $\sin 45^\circ \cdot \cos 120^\circ - \sec 30^\circ \cdot \csc 240^\circ$

Answer: $-\frac{\sqrt{6}}{4} + \frac{4}{3}$