_____ = _____
70 100

Name: Key

Precalculus: Unit 5 Pretest
Trigonometric Functions

1. Convert $\frac{7\pi}{18}$ radians to degrees. (N-Q-1) (4 points)

$\frac{7\pi}{18} \cdot \frac{180}{\pi} = 70°$

2. MULTIPLE CHOICE: If $\cos 40° = a$, what is $\sin 50°$ in terms of a? (G-SRT-7) (3 points)

a. a b. $\frac{1}{a}$ c. $90 - a$ d. $a\sqrt{2}$

3. Find the measure of the radius of a circle with a central angle of $110°$ that intercepts an arc of 20 centimeters. (F-TF-1) (5 points)

$\frac{110}{360} = \frac{20}{2\pi r}$ $r = 10.42$ cm

4. Use your unit circle to find the exact value (no decimals) of each of the following: (F-TF-2, F-TF-3) (3 points each)

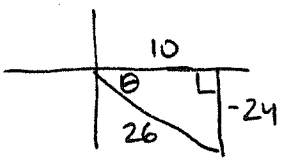
a. $\cos\frac{11\pi}{6} = \frac{\sqrt{3}}{2}$

b. $\tan\frac{19\pi}{3} = \tan\frac{\pi}{3} = \frac{\sqrt{3}}{3}$

c. $\sec\frac{9\pi}{2} = \frac{1}{\cos\frac{\pi}{2}} = \frac{1}{0}$ undefined

d. $\sin\frac{-15\pi}{4} = \sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

5. If the point $(10, -24)$ is on the terminal side of θ, determine the exact value (no decimals) of the six trigonometric functions of θ. (Draw an appropriate reference triangle.) (F-TF-3) (7 points)

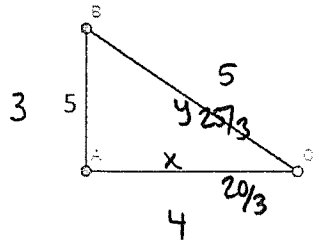


$\sin\theta = \frac{-12}{13}$ $\quad \csc\theta = \frac{-13}{12}$

$\cos\theta = \frac{5}{13}$ $\quad \sec\theta = \frac{13}{5}$

$\tan\theta = \frac{-12}{5}$ $\quad \cot\theta = \frac{-5}{12}$

6. Given that $AB = 5$ and $\tan B = \frac{4}{3}$ in the right triangle below, what is the value of $\sin B + \cos B$? (G-SRT-6) (5 points)



$\frac{4}{3} = \frac{x}{5}$ $\quad y = 25/3$

$x = 20/3$

$\frac{3}{5} = \frac{5}{y}$

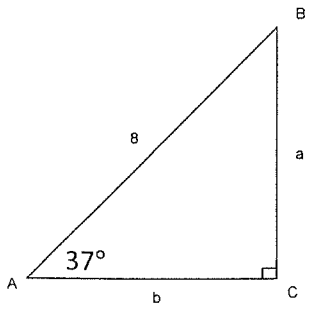
$\sin\theta = \frac{20/3}{25/3} = 4/5$

$\cos\theta = 3/5$

$\sin\theta + \cos\theta = \boxed{7/5}$

7. Solve the following right triangles. Round all answers to the hundredths place. (Make sure your calculator is in degree mode.) (G-SRT-8) (8 points each)

a.



$\sin 37 = a/8$

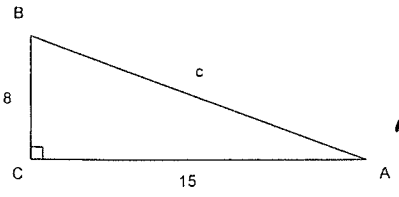
$\cos 37 = b/8$

$a = \boxed{4.81}$

$b = \boxed{6.39}$

$m\angle B = \boxed{53°}$

b.



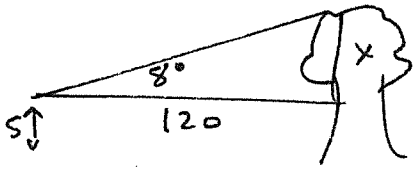
$A = \tan^{-1}(8/15)$

$c = 17$

$m\angle A = 28.07°$

$m\angle B = 61.93°$

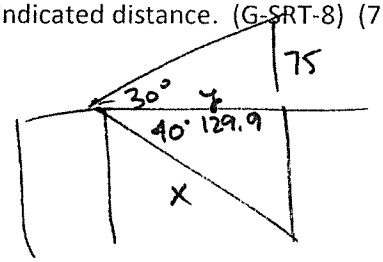
8. A surveyor places her telescope on the top of a tripod 5 feet above the ground. She measures and 8° angle of elevation above the horizontal to the top of the tree that is 120 feet away. How tall is the tree? Draw a diagram to represent the situation and calculate the height of the tree. (G-SRT-8) (6 points)



$\tan 8° = \frac{x}{120}$ $x = 16.86$

21.86 ft.

9. Batman was standing atop Wayne enterprises when he saw the Bat signal 75 feet above him at a 30° angle of elevation. Detective Gordon is already at the crime scene. The angle of depression from Batman to the crime scene is 40°. If the Bat signal is directly above the crime scene, how far away from the crime scene is Batman? Draw a diagram to illustrate the situation and find the indicated distance. (G-SRT-8) (7 points)



$\tan 30 = \frac{75}{y}$ $y = 129.9$

$\cos 40° = \frac{129.9}{x}$

$x = 169.58$ ft

10. In a truck with 36 inch wheels (18 inch radius), if the wheels are rotating at 630 rpm, find the truck's speed in miles per hour. (5 points)

$$\frac{630 \text{ rev}}{1 \text{ min}} \cdot \frac{36\pi \text{ in}}{1 \text{ rev}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 67.47 \text{ mph}$$

(+18)