Basic Trig Concepts Test Name________________________

Section 1: Angle Measures

Convert into degrees, minutes, and seconds. Round to the **nearest second**.

1. 137.8217°

$.8217 \times 60 = 49.302 \Rightarrow 49'$

$.302 \times 60 = 18.12 \Rightarrow 18''$

1. $137° \, 49' \, 18''$

Convert from degrees, minutes, and seconds to decimal form. Round to the **nearest thousandths**.

2. 48° 52' 16"

$16 \div 60 = .2\overline{6}$

$52.2\overline{6} \div 60 = .87\overline{1}$

$48.87\overline{1}°$

2. $48.871°$

Convert from degrees to radians.

3. 320°

$320\left[\frac{\pi}{180}\right] = \frac{16\pi}{9}$

3. $\frac{16}{9}\pi$

Convert from radians to degrees

4. $\frac{5}{6}\pi$

$\frac{5\pi}{6}\left[\frac{180}{\pi}\right] = 150°$

4. $150°$

Find the standard position of each angle with coterminal side found [0° , 360°], also identify which quadrant the angle falls in.

5. 3865°

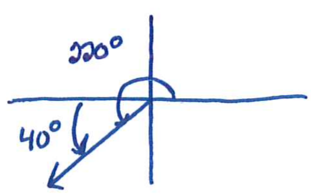
$3865 \div 360 = 10.736\overline{1}$

$3865 - 360[10] = 265°$

5. $265°$ QUADRANT III

Find the reference angle for each of the following

6. 220°

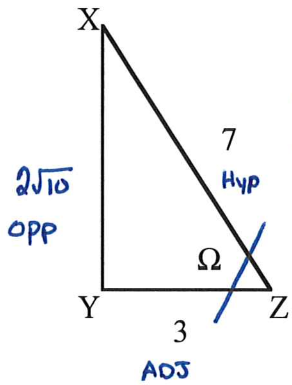


6. $40°$

Section 2: Trig Functions

Find the values for the six trig functions.

7.



$\ell^2+\ell^2=h^2$

$\ell^2+3^2=7^2$

$\ell^2+9=49$

$\ell^2=40$

$\ell=2\sqrt{10}$

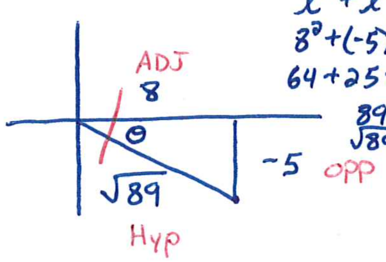
$\sin \Omega = \frac{2\sqrt{10}}{7}$ $\csc \Omega = \frac{7\sqrt{10}}{20}$

$\cos \Omega = \frac{3}{7}$ $\sec \Omega = \frac{7}{3}$

$\tan \Omega = \frac{2\sqrt{10}}{3}$ $\cot \Omega = \frac{3\sqrt{10}}{20}$

Find the values for the six trig functions.

8. $\left(8 ,-5 \right)$



$\ell^2+\ell^2=h^2$

$8^2+(-5)^2=h^2$

$64+25=h^2$

$89=h^2$

$\sqrt{89}=h$

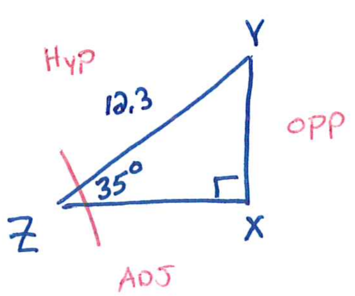
$\sin \theta = \frac{-5\sqrt{89}}{89}$ $\csc \theta = \frac{-\sqrt{89}}{5}$

$\cos \theta = \frac{8\sqrt{89}}{89}$ $\sec \theta = \frac{\sqrt{89}}{8}$

$\tan \theta = \frac{-5}{8}$ $\cot \theta = \frac{-8}{5}$

Solve the following using right triangle trig.

9. In ΔXYZ, $X = 90°$ find y to the nearest tenth if $Z = 35°$ and $x = 12.3$



$\cos 35° = \frac{y}{12.3}$

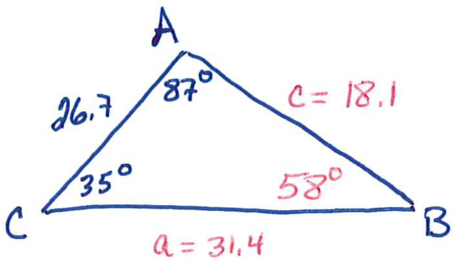
$12.3 \cos 35° = y$

$10.1 = y$

Section 3: Trig Laws

Using law of sines solve the triangle to the nearest tenth.

10. In ΔABC, A = 87˚, C= 35˚, and b = 26.7



$$\frac{a}{\sin 87^\circ} = \frac{26.7}{\sin 58}$$

$$a = \frac{26.7 \sin 87}{\sin 58}$$

$$a = 31.4$$

$$\frac{c}{\sin 35} = \frac{26.7}{\sin 58}$$

$$c = 18.1$$

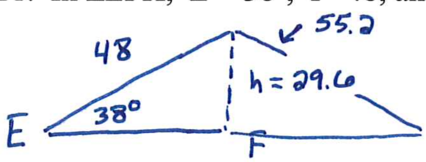
a = 31.4

c = 18.1

10.____ B = 58°____

Determine the number of triangles possible.

11. In ΔEFK, E = 38˚, f= 48, and e = 55.2



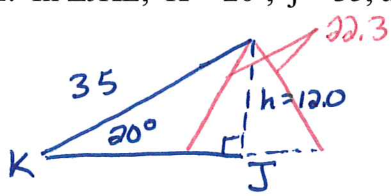
$$\sin 38 = \frac{h}{48}$$

$$48 \sin 38 = h$$

$$29.6 = h$$

11.____ ONE TRIANGLE ____

12. In ΔJKL, K = 20˚, j = 35, and k = 22.3



$$\sin 20^\circ = \frac{h}{35}$$

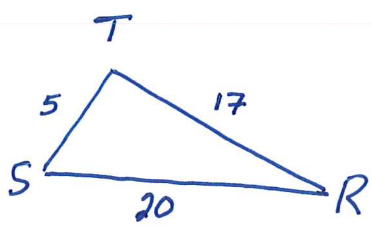
$$35 \sin 20^\circ = h$$

$$12.0 = h$$

12.____ TWO TRIANGLES ____

Using law of cosines solve the triangle to the nearest tenth for all angles.

13. In ΔRST, r = 5, s = 17, and t = 20



R = 12.5°

S = 47.1°

13.____ T = 120.4°____

I $\quad 20^2 = 17^2 + 5^2 - 2(17)(5)\cos T$

$$\cos^{-1}\left[\frac{20^2 - 17^2 - 5^2}{-2(17)(5)}\right] = T$$

$$120.4^\circ = T$$

KEEP ALL DECIMALS IN CALCULATOR

II $\quad \dfrac{\sin R}{5} = \dfrac{\sin 120.4}{20}$

$$R = \sin^{-1}\left[\frac{5 \sin 120.4}{20}\right]$$

$$R = 12.5^\circ$$

III $\quad 180 - 120.4 - 12.5$

$$S = 47.1^\circ$$

Section 4: Classifying Triangles

Consider the lengths of the sides for the proposed triangle. First determine if the triangle can exist, then classify the triangle as acute, right, or obtuse. If no triangle is possible then state it as such.

14. d = 8 , e = 9, f = 13

$$\left.\begin{matrix} 9+8=17 \\ 9-8=1 \end{matrix}\right\} \text{13 FALLS IN RANGE}$$

$$8^2+9^2 \quad 13^2$$

$$64+81 < 169 \qquad \text{OBTUSE}$$

14. OBTUSE Δ

15. a = 5, b = 13, c = 5

$$\left.\begin{matrix} 5+5=10 \\ 5-5=0 \end{matrix}\right\} \text{13 DOES NOT FALL IN RANGE}$$

15. NO TRIANGLE EXISTS

Section 5: Areas of Triangles

Use the determinant of a matrix to find the area of a triangle.

16. Vertices are $(9,-1),(-2,-2),(-3,5)$

$$\text{AREA} = \frac{1}{2}\begin{vmatrix} 9 & -1 & 1 \\ -2 & -2 & 1 \\ -3 & 5 & 1 \end{vmatrix}$$

$$= 39$$

16. 39 UNITS^2

Use Heron's Formula to find the area of a triangle.

17. g = 14, h = 7, k = 11

$$\text{SEMI PERIMETER} = \frac{14+7+11}{2} = 16$$

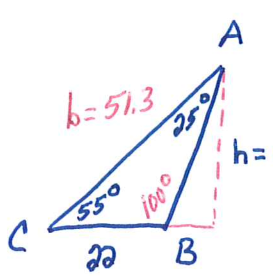
$$\text{AREA} = \sqrt{16(16-14)(16-7)(16-11)}$$

$$= 37.9$$

17. 37.9 UNITS^2

Use trig to find the area of the triangle.

18. A = 25°, a = 22, C = 55°



$$\frac{b}{\text{SIN } 100^\circ} = \frac{22}{\text{SIN } 25^\circ}$$

$$b = \frac{22 \text{ SIN } 100^\circ}{\text{SIN } 25^\circ}$$

$$b = 51.3$$

* KEEP DECIMALS IN CALCULATOR

$$\text{SIN } 55^\circ = \frac{h}{51.3}$$

$$51.3 \text{ SIN } 55^\circ = h$$

$$\text{AREA} = \frac{1}{2} b h$$

$$= \frac{1}{2}[22] \cdot 51.3 \text{ SIN } 55^\circ$$

$$= 461.9$$

18. 461.9 UNITS^2

Section 6: Finding Solutions by Inspection

This is a review of the last chapter. Be sure to check out zeros or restrictions along with proposed answers from argument on the number line to test for final solutions.

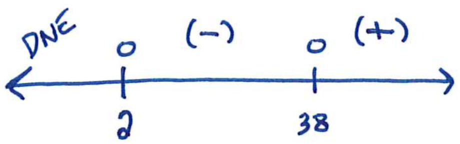
19. $\sqrt{x-2}+5 \le 11$

RESTRICTION $x \ge 2$

$\sqrt{x-2} \le 6$

$x-2 \le 36$

$x \le 38$



CONSIDER

$\sqrt{x-2} - 6 \le 0$

* LOOK FOR NEGATIVE RESULTS OR ZERO

19. D: $[2, 38]$

20. $\dfrac{20}{x^2-36} < \dfrac{8}{x-6} + \dfrac{5}{x+6}$

RESTRICTIONS $x \ne \{-6, 6\}$

$\left[\dfrac{20}{x^2-36} < \dfrac{8}{x-6} + \dfrac{5}{x+6}\right](x-6)(x+6)$

$20 < 8(x+6) + 5(x-6)$

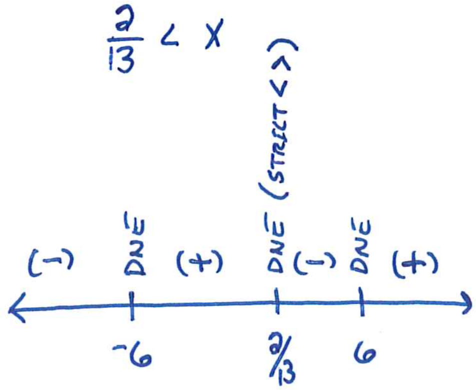
$20 < 8x + 48 + 5x - 30$

$20 < 13x + 18$

$2 < 13x$

$\dfrac{2}{13} < x$

20. D: $(-6, 2/13) \cup (6, \infty)$



CONSIDER

$0 < \dfrac{-20}{x^2-36} + \dfrac{8}{x-6} + \dfrac{5}{x+6}$

* LOOK FOR STRICTLY POSITIVE RESULTS