SM3 Unit11 Review Name:_________________

Evaluate each. Using the unit circle for each.

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

A $-\frac{\pi}{3}$ B $-\frac{\pi}{6}$ C $\frac{\pi}{6}$ D $\frac{\pi}{3}$

2) $\text{arccot}(1)$

A $-\frac{\pi}{4}$ B 0 C $\frac{\pi}{4}$ D $\frac{3\pi}{4}$

3) $\text{arccsc}\left(\frac{-2\sqrt{3}}{3}\right)$

A $-\frac{\pi}{3}$ B $-\frac{\pi}{6}$ C $\frac{2\pi}{3}$ D $\frac{5\pi}{6}$

4) $\cos\left(\arcsin\left(-\frac{1}{2}\right)\right)$

$\cos\left(-\frac{\pi}{6}\right)$

A $\frac{\sqrt{3}}{2}$ B $\frac{1}{2}$ C $\frac{2\pi}{3}$ D $-\frac{\pi}{3}$

5) $\text{arcsec}\left(\sec\left(\frac{\pi}{3}\right)\right)$

$\text{arcsec}(2)$

A $-\frac{\pi}{3}$ B $\frac{\pi}{3}$ C $\frac{2\pi}{3}$ D $\frac{5\pi}{3}$

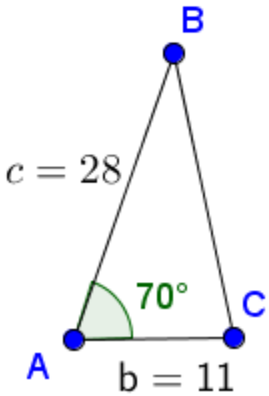
6) $\arccos\left(\cos\left(\frac{5\pi}{4}\right)\right)$

$\arccos\left(-\frac{\sqrt{2}}{2}\right)$

A $-\frac{\sqrt{2}}{2}$ B $-\frac{\pi}{4}$ C $\frac{\pi}{4}$ D $\frac{3\pi}{4}$

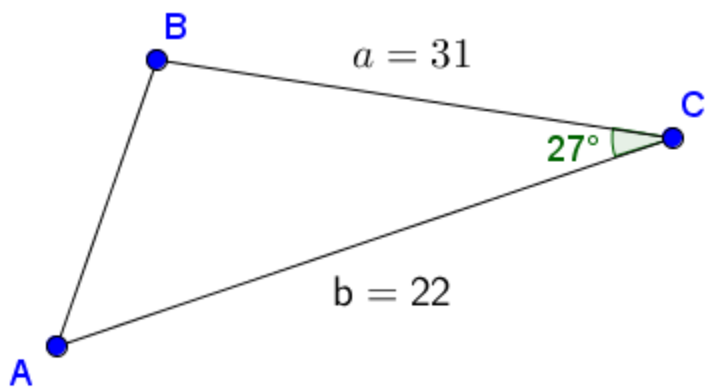
Find the area of each triangle. Round to the nearest tenth.

7) $m\angle A = 71°, c = 28, b = 11$



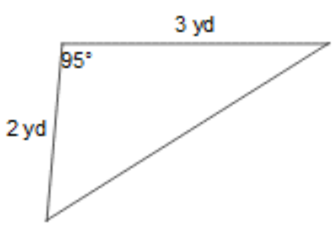
$$Area = \frac{1}{2}bc\sin A$$
$$= \frac{1}{2}(11)(28)\sin 71$$
$$= 145.6\ units^2$$

8) $m\angle C = 27°, b = 22, a = 31$



$$Area = \frac{1}{2}bc\sin A$$
$$= \frac{1}{2}(31)(22)\sin 27$$
$$= 154.8\ units^2$$

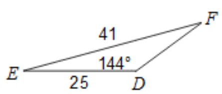
9)



$$Area = \frac{1}{2}bc\sin A$$
$$= \frac{1}{2}(2)(3)\sin 95$$
$$= 3\ yd^2$$

Solve each triangle. Round to the nearest tenth.

10) SSA- Law of Sines



$$\frac{\sin 144°}{41} = \frac{\sin F}{25}$$

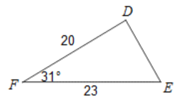
$$41\sin F = 25\sin 144°$$
$$\sin F = \frac{25\sin 144°}{41}$$
$$\sin F = .3584056$$
$$F = \sin^{-1}.3584056$$
$$F = 21°$$

$$E = 180 - 144 - 21$$
$$E = 15°$$

$$\frac{\sin 144°}{41} = \frac{\sin 15°}{e}$$

$$e\sin 144° = 41\sin 15°$$
$$e = \frac{41\sin 15°}{\sin 144°}$$
$$e = 18.1$$

11) SAS- Law of Cosines

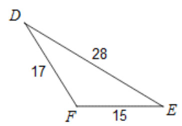


$$f^2 = 23^2 + 20^2 - 2(20)(23)\cos 31°$$
$$f^2 = 140.40608$$
$$f = 11.8$$

$$\frac{\sin 31°}{11.8} = \frac{\sin E}{20}$$
$$20 \sin 31° = 11.8 \sin E$$
$$\sin E = \frac{20 \sin 31°}{11.8}$$
$$\sin E = .872946$$
$$E = \sin^{-1}(.872946)$$
$$E = 60.8°$$

$$D = 180 - 31 - 60.8$$
$$D = 88.2°$$

12) SSS- Law of Cosines

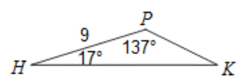


$$15^2 = 17^2 + 28^2 - 2(17)(28)\cos D$$
$$225 = 289 + 784 - 952 \cos D$$
$$-848 = -952 \cos D$$
$$\cos D = \frac{-848}{-952}$$
$$\cos D = .890756$$
$$D = \cos^{-1}.890756$$
$$D = 27°$$

$$\frac{\sin 27°}{15} = \frac{\sin E}{17}$$
$$17 \sin 27° = 15 \sin E$$
$$\sin E = \frac{17 \sin 27°}{15}$$
$$\sin E = .5145226$$
$$E = \sin^{-1}.5145226$$
$$E = 31°$$

$$F = 180 - 27 - 31$$
$$F = 122°$$

13) ASA-Law of Sines



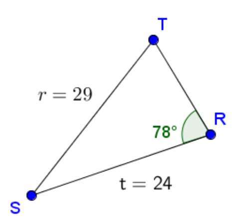
$$K = 180 - 17 - 137$$
$$K = 26°$$

$$\frac{\sin 26°}{9} = \frac{\sin 137°}{p}$$
$$p \sin 26° = 9 \sin 137°$$
$$p = \frac{9 \sin 137°}{\sin 26°}$$
$$p = 14$$

$$\frac{\sin 26°}{9} = \frac{\sin 17°}{h}$$
$$h \sin 26° = 9 \sin 17°$$
$$h = \frac{9 \sin 17°}{\sin 26°}$$
$$h = 6$$

14) In $\Delta STR, m\angle R = 78°, r = 29, t = 24$

SSA- Law of Sines



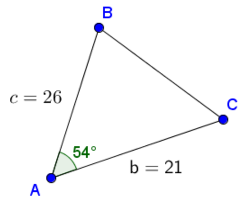
$$\frac{\sin 78°}{29} = \frac{\sin T}{24}$$
$$24 \sin 78° = 29 \sin T$$
$$\sin T = \frac{24 \sin 78°}{29}$$
$$\sin T = .809501$$
$$T = \sin^{-1}.809501$$
$$T = 54°$$

$$S = 180 - 78 - 54$$
$$S = 48°$$

$$\frac{\sin 78°}{29} = \frac{\sin 48°}{s}$$
$$s \sin 78° = 29 \sin 48°$$
$$s = \frac{29 \sin 48°}{\sin 78°}$$
$$s = 22°$$

15) In $\Delta ABC, m\angle A = 54°, c = 26, b = 21$

SAS-Law of Cosines



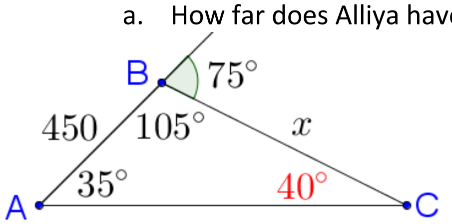
$$a^2 = 21^2 + 26^2 - 2(21)(26)\cos 54°$$
$$a^2 = 475.138504$$
$$a = 21.8$$

$$\frac{\sin 54°}{21.8} = \frac{\sin B}{21}$$
$$21\sin 54° = 21.8\sin B$$
$$\sin B = \frac{21\sin 54°}{21.8}$$
$$\sin B = .779328$$
$$B = \sin^{-1}.779328$$
$$B = 51.2°$$

$$C = 180 - 54 - 51.2$$
$$C = 74.8°$$

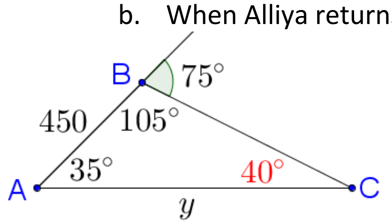
16) Alliya is taking a walk along a straight road. She decides to leave the road, so she walks on a path that makes an angle of 35° with the road. After walking for 450 meters, she turns 75° and starts heading back towards the road.

a. How far does Alliya have to walk get back to the road?



$$C = 180 - 35 - 105 = 40$$
$$\frac{\sin 40}{450} = \frac{\sin 35}{x}$$
$$x = 401.5\ m$$

b. When Alliya returns to the road, how far is she from where she started?



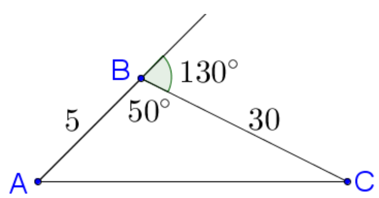
$$\frac{\sin 40}{450} = \frac{\sin 105}{y}$$
$$y = 676.2\ m$$

17) In order to demonstrate that math teachers can also be athletic, Mr. Wytiaz agrees to compete in a triathlon. Not being in the best physical condition, he plans to substitute professional athletes in his place on the race. He constructs masks and suits in order to disguise his impersonators.

Mr. Wytiaz gets Michael Phelps to swim for him in exchange for performing the math research necessary to develop a surgical procedure to make the webbing of his hands, webbing of his feet, and gills less visible. Lance Armstrong agrees to cycle in exchange for a formula that will mask the presence of certain pharmaceuticals. Lastly, OHS track Coach Jacobs offers to run if it means students being excused for track meets without hassle for the rest of his life.

From the starting point, racers will swim 5 miles, turn 130°, and bike for 30 miles. As the starting point will also be the ending point of the race, the contestants will then run directly back to the starting point.

How long, to the nearest tenth of a mile, will Coach Jacobs run?



$$b^2 = a^2 + c^2 - 2ac\cos B$$

$$b^2 = 30^2 + 5^2 - 2(30)(5)\cos 50$$

$$b^2 = 732.1637$$

$$b = 27.1\ mi$$