Quiz 2 (20 pts.)   Name: _KEY_

True or False (1 pt. each)

Answer the following by circling TRUE or FALSE. If the answer is false you must explain why in the space provided for full credit.

1.) **T** (**F**) _angle of elevation_ — An angle measured *upward* from the horizontal is called an angle of depression.

2.) (**T**) **F** — $S=(2)(2.5)=5$ ✓ — In a circle of radius 2, the arc length subtended by a central angle of 2.5 rad is 5 in.

3.) (**T**) **F** — $\frac{\pi}{3} - \frac{7\pi}{3} = \frac{-6\pi}{3} = -2\pi$ ✓ — The angles $\alpha = \frac{\pi}{3}$ and $\beta = \frac{7\pi}{3}$ are coterminal.

4.) **T** (**F**) _tangent_ — One should use the trig function sine to determine the distance d of the ship from the shore. (Assume the triangle to the left is a right triangle.)

d = distance from shore

9.5°

55 ft
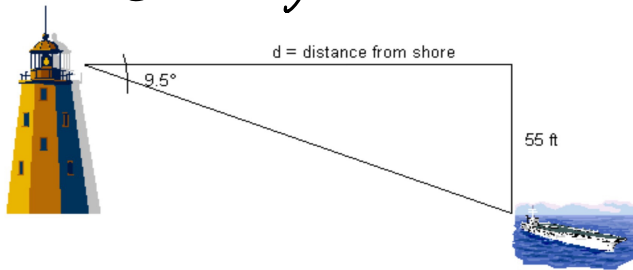
5.) (**T**) **F** — $\frac{3\pi}{2}$ converts to 270°

Short Answer

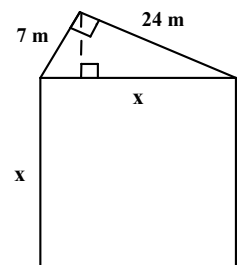6.) (4 pts.) Find the area of the polygon in the following figure:

7 m   24 m

x

x

$A =$ area of triangle + area of square $= 84 + 625$

$= \boxed{709 \text{ m}^2}$

$T = \frac{1}{2}(7)(24)$

$= \frac{1}{2}(168)$

$= \underline{84}$

$24^2 + 7^2 = x^2$
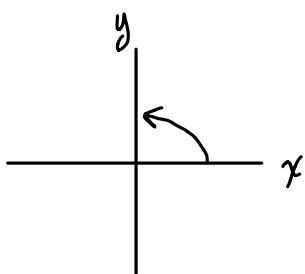
$625 = x^2$

$25 = x$

$S = (25)^2$

$= \underline{625}$

7.) (2 pts.) Suppose a circle has a radius of 6 cm. Find the area of the sector with a central angle of 10°.

$$A = \frac{\pi}{360} r^2 \theta = \frac{\pi}{360}(6)^2(10) = \frac{\pi}{360}(36)(10) = \frac{\pi}{360}(360) = \frac{360\pi}{360} = \boxed{\pi \text{ cm}^2}$$

8.) (2 pts.) Find the measures of the two nearest angles (one positive and one negative) that are coterminal with the given angle.

(a) 90° (in degrees)

← positive

$$90° + 360° = \boxed{450°}$$
$$90° - 360° = \boxed{-270°}$$

↑ negative

(b) $-\dfrac{5\pi}{6}$ (in radians)

← positive

$$\frac{-5\pi}{6} + \frac{12\pi}{6} = \boxed{\frac{7\pi}{6}}$$

$$\frac{-5\pi}{6} - \frac{12\pi}{6} = \boxed{\frac{-17\pi}{6}}$$

↖ negative

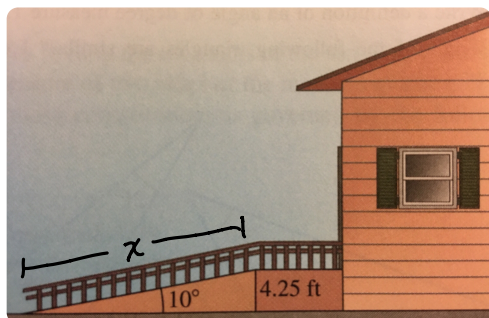**9.)** (4 pts.) From the top of a lighthouse 21 m high, a sailboat is sighted at an angle of depression of 6°. How far from the base of the lighthouse is the boat? (Hint: draw a picture.)
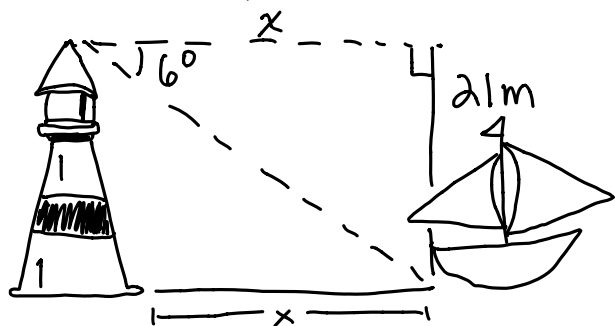
$$\tan 6° = \frac{21}{x}$$

$$\Rightarrow (\tan 6)(x) = 21$$

$$\Rightarrow x = \frac{21}{\tan 6}$$

$$\Rightarrow \boxed{x = 199.8 \text{ m}}$$

10.) (3 pts.) The front porch of a house is 4.25 ft high. The angle of elevation of a ramp from the ground to the porch is 10°. How long is the ramp?

x = length of ramp

$$\sin 10° = \frac{4.25}{x}$$

$$\Rightarrow (\sin 10)(x) = 4.25$$

$$\Rightarrow x = \frac{4.25}{\sin 10}$$

$$\Rightarrow \boxed{x = 24.5 \text{ ft}}$$