**5-6 Lesson Master**

Questions on SPUR Objectives  

**SKILLS** Objective B

In 1-3, evaluate without a calculator. Give an exact answer in radians.

1. \( \tan^{-1}\sqrt{3} \)  
2. Arctan(-1)  
3. \( \tan^{-1}\left(\tan\left(\frac{5\pi}{4}\right)\right) \)

In 3-6, approximate to the nearest hundredth of a degree.

4. \( \tan^{-1}(-0.73) \)  
5. \( \tan^{-1}8 \)  
6. Arctan 8

**SKILLS** Objective D

In 7 and 8, find \( \theta \), where \(-90^\circ \leq \theta \leq 90^\circ\), to the nearest hundredth.

7. \( \tan \theta = -4 \)  
8. \( \frac{1}{3} \tan(3\theta) = 4 \)

**PROPERTIES** Objective G

In 9 and 10, an equation for a function is given.  

a. State its domain.  

b. State its range.

9. \( f(x) = \tan^{-1} x \)  
10. \( z(t) = 2 \tan^{-1} t \)

**PROPERTIES** Objective J

11. A submarine is \( d \) yards from the entrance of a harbor and submerged \( s \) feet.  

   The captain wants to maintain a constant angle of ascent that will allow the submarine to surface at the entrance to the harbor.

   a. Use the inverse tangent function to write a formula for the angle of ascent \( \theta \), in terms of \( s \) and \( d \).

   b. Suppose the submarine’s deck is submerged 385 feet at a distance of 20,000 yards from the harbor. What angle of ascent will allow the submarine to surface at the entrance to the harbor?
c. There is a reef 1,000 yards from the harbor entrance that rises to within 60 feet of the surface. The submarine’s keel is 30 feet from below its deck. What angle of ascent is needed for the submarine to clear the reef?

d. If the submarine maintains the angle of ascent in Part b will it clear the reef in Part c?

**REPRESENTATIONS**

Objective L

12. Graph \( f(x) = \tan^{-1} x \).

13. Describe all symmetries of the graph of the inverse tangent function. ________________________