1. (a) Use properties of inverse trig. functions to evaluate the expression 

\[ \sin^{-1}(\sin(3\pi)). \]

\[ \sin^{-1}(\sin(3\pi)) = \sin(0) = 0 \]

Not 3\pi since 3\pi is not in the range of \( \sin^{-1}(x) \).

(b) Find the exact value of the expression (Hint: Sketch a right triangle.)

\[ \cos(\arctan(2)). \]

Let \( \theta = \arctan(2) \):

\[ \tan(\theta) = 2 \]

Since \( \tan(\theta) > 0 \) we know \( \theta \) is in QI.

By Pythagorean Thm:

\[ c^2 = 2^2 + 1^2 \]

\[ c = \sqrt{5} \]

\[ \cos(\arctan(2)) = \frac{1}{\sqrt{5}} \]

2. A ship is 45 miles east and 30 miles south of port. The captain wants to sail directly back to port. What bearing should be taken?

N 56.31° W
3. Perform the subtraction and then use the fundamental identities to simplify the expression

\[ \tan(x) - \frac{\sec^2(x)}{\tan(x)} \]

\[ \tan(x) = \frac{\sec^2(x)}{\tan(x)} \]

\[ \tan(x) \cdot \tan(x) = \frac{\sec^2(x)}{\tan(x)} \]

\[ = \frac{\tan^2(x)}{\tan(x)} - \frac{\sec^2(x)}{\tan(x)} \]

\[ = \tan^2(x) - \frac{\sec^2(x)}{\tan(x)} \]

\[ \text{Pythagorean Identity: } \tan^2(x) + 1 = \sec^2(x) \]

\[ \text{Quotient Identity: } \cot(x) = \frac{1}{\tan(x)} \]

\[ = \frac{\tan^2(x) - \sec^2(x)}{\tan(x)} \]

\[ = \frac{-1}{\tan(x)} \]

\[ = -\cot(x) \]