Pirate Cove   Name_____

1.   This map shows the location of the *Salmon King* when its skipper decided to navigate to
     Pirate's Cove. The length of the route indicated on the map below is 20 nm and direction
     45 degrees. Suppose that as the *Salmon King* heads for Pirate's Cove, a strong wind
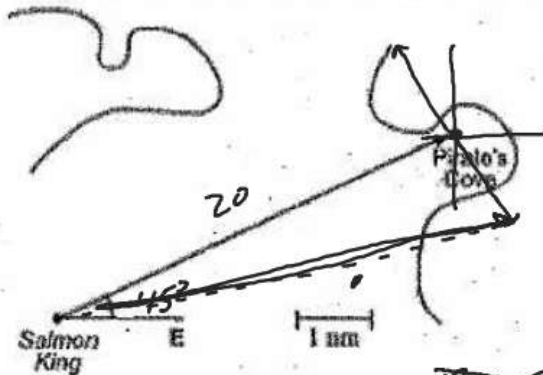   blows at 5 knots in a direction of 105°.

   a. Find the components for the vector representing the *Salmon King*'s location

$$\langle 20\cos 45, 20\sin 45° \rangle$$

   b. Find the components of the wind vector.

$$\langle 5\cos 105, 5\sin 105 \rangle$$

   c. The skipper wants to be moving on a course toward Pirate's Cove at about 20 knots,
       using the wind to help her. What direction and speed should she set to account for the
       wind and arrive at Pirate's Cove as planned? Include a diagram in your explanation.

$$\langle 20\cos 45 - 5\cos 105, 20\sin 45 - 5\sin 105 \rangle$$

$$\langle 15.43, 9.31 \rangle$$

Speed Boat $= 18.03$ knots

$$\tan^{-1}\left(\frac{9.31}{15.43}\right) = 31.1°$$

B→W

B−W

Even More Pirate Practice

Name_____

1. This map shows the location of the *Salmon King* when its skipper decided to navigate to Pirate's Cove. The length of the route indicated on the map below is 30 nm and direction 54 degrees. Suppose that as the *Salmon King* heads for Pirate's Cove, a strong wind blows at 7 knots in a direction of 115°.

   a. Find the components for the vector representing the *Salmon King*'s location

   $$\langle 30\cos 54, 30\sin 54\rangle$$

   b. Find the components of the wind vector.

   $$\langle 7\cos 115°, 7\sin 115\rangle$$

   c. The skipper wants to be moving on a course toward Pirate's Cove at about 30 knots, using the wind to help her. What direction and speed should she set to account for the wind and arrive at Pirate's Cove as planned? Include a diagram in your explanation.
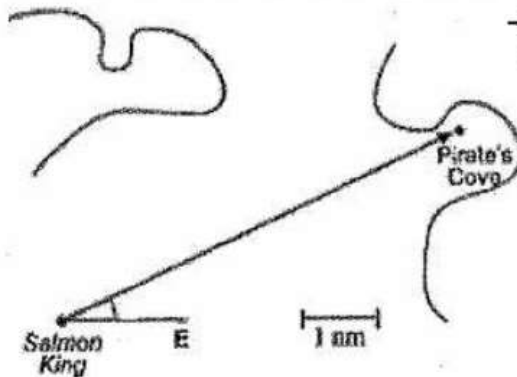
   $$\vec{b}-\vec{w} = \langle 30\cos 54 - 7\cos 115, 30\sin 54 - 7\sin 115\rangle$$

   $$\langle 20.59, 17.92\rangle$$

   $$\text{Speed} = 27.29 \text{ knots}$$

   $$\tan^{-1}\left(\frac{17.92}{20.59}\right) = 41°$$