Round: 11A

Ice presents a constant danger for ships operating in the Arctic. Ships can sustain damage from collisions or become trapped and unable to move (beset). There are two (2) kinds of ice floating in the Arctic: sea ice and icebergs.

1. Describe the seasonal cycle of formation and melting of sea ice. During what months would you expect the sea ice to reach its maximum? Its minimum? (4 pts)

2. Sea ice is classified by its thickness and age. Why is multi-year sea ice much stronger than new sea ice? (2 pts)

3. Describe the formation of icebergs. (3 pts)

4. Why does sea ice tend to move faster than icebergs? (2 pts)

Because of the danger of ice to ships, it is useful for mariners to predict where sea ice will be in the future. The relationship between wind and sea ice drift is so strong that a general guideline can be applied: sea ice that drifts freely moves at about 2% of the wind speed.

Although the direction depends on the size of the sea ice moving, for this exercise assume sea ice moves 30 degrees to the right (Northern Hemisphere) or left (Southern Hemisphere) of the wind direction. When considering the combined effects of wind and currents, determine the motion of the sea ice for the question #5.

5. A large ice flow is located in the Greenland Sea at 0800 on April 11. Where will it be at 2000 on April 13 if there is a constant wind blowing at 25 knots from the west southwest at 240 degrees? The surface current is flowing directly south at 0.5 knots. Estimate the answer to the nearest nautical mile. Show your work. (9 pts)