**Group Component**

**Directions:**

* Work in small groups of two to three people. **Each group will hand in one completed project**.
* SHOW ALL WORK to receive FULL CREDIT.
* Report correct units on your answers.
* Use **** **on your calculator** for a more **accurate** answer. DO NOT USE 3.14.
* You will turn your project in at the end of class.

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Scientists believe that due to climatic changes ice sheets and the polar ice caps are melting. The impact on the world’s coastal areas, climate, and economy could be devastating. It is important to look into how significant the effects could be, as well as determine the causes of this phenomenon and share suggestions to address the problem.

**Fact**: **Greenland’s ice sheet** contains approximately 680,000 cubic miles of water.

Current predictions say that **Greenland’s ice sheet will melt completely** in less than a century. Let’s assume that the melting process can be modeled by a linear equation, which is based on the year 2007.

1. Complete the following table, assuming that the melting rate of Greenland’s ice sheet is 8000 mi3 per year (since 2007). Let *x* **=** 0 represent 2007. Hint: Because the ice sheet is melting, volume is decreasing.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | 2007 | 2008 | 2009 | 2010 |
| ***x****:* Elapsed time (in years) from 2007 |  |  1 |   |   |
| **V**: Total volume of Greenland’s ice sheet (in mi3) | 680,000  |  |  |  |

1. Fill in the missing parts of the sentence below.

The total volume of Greenland’s ice sheetis \_\_\_\_\_\_\_\_\_\_\_\_\_\_ minus \_\_\_\_\_\_\_\_\_\_\_\_\_times the

number of years after 2007.

1. Translating the sentence above, create a formula to calculate the total volume, , of the **Greenland ice sheet** that remains in terms of the years elapsed from 2007, *x.*
2. Use the formula from part (c) to predict the year in which the entire **Greenland ice sheet** will have melted by SOLVING an equation. *HINT: If the ice sheet has melted, it has no volume.*

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1. The **formula** for the surface area of a sphere is given by $S=4πr^{2}$. Identify what each variable stands for. NOTE: **** is not a variable.

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1. Although the shape of the Earth is not exactly spherical, its surface area can be approximated using this formula. The Earth has a radius of roughly 3,960 miles. Estimate the surface area of the Earth using your formula from part (e). [*For the answer, keep all decimal places you see on the calculator.*]
2. Oceans cover approximately **71%** of the total surface area of the Earth. Calculate how many square miles of the Earth’s surface are covered by oceans. [*For the answer, keep all decimal places you see on the calculator.*]
3. The potential rise in sea level if this ice sheet melted entirely can be approximated by **dividing the total volume of the water in the ice sheet by the surface area of the oceans**. How much would the sea level rise if Greenland’s ice sheet melted entirely? [*For the answer, keep all decimal places you see on the calculator.*]
4. Convert your answer to feet. *HINT: There are 5,280 feet in one mile*. [*Round to the hundredths.*]

**Fact**: The **Antarctic Ice Cap** contains the equivalent of approx. 6,300,000 cubic miles of water.

1. The potential rise in sea level if this cap melted entirely can be approximated by **dividing the total volume of the water** in the ice cap **by** **the surface area** **of the oceans**. How much would the sea level rise if the Antarctic Ice Cap melted entirely? [*For the answer, keep all decimal places you see on the calculator.*]

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1. Convert your answer to feet. [*Round to the hundredths.*]