



Module Title: *Dimensional and Cost Calculations*

Museum Exhibit Association: *What's In a Maritime Painting?*

Subject: MATHEMATICS

National Standards Criteria: Grades 3 - 5 Number and Operations

Background Description:

There are numerous ways to compute value for a given painting. Many factors go into determining the value of a painting. While it is by no means determinative, sometimes it is helpful to compare prices of a paintings based on the ratio of size to cost. To do so, one must calculate the **area** of a painting and then divide the cost by the area. Area is expressed in square increments, for example a painting 10 inches by 12 inches would have an area of 120 square inches. In the United States the **American Standard** is used to express measurement and internationally **Metric** is used.

Activities:

Calculating Area in American Standard: In the United States dimensions are measured in feet and inches or what is known as American Standard.

1. If the dimensions of a painting are 18 inches by 34 inches, how many square inches are there in the painting?
2. The dimensions of a painting are 2 feet by 3 feet, how many square inches are in the painting?
3. If a painting is 12 inches square, how many square inches are in the painting?
4. If a painting is 100 square inches, what are its dimensions?

Calculating Cost per Area:

1. If a painting cost US\$10,000 and the painting is 600 square inches, what is the cost per square inch?
2. A painting cost US\$12,000 and is 33 inches by 48 inches;
 - a. Is it more or less expensive than a painting that is 15 inches by 28 inches and cost US\$8,000?
 - b. How much is the difference in US dollars per square inch between the more expensive painting and the less expensive painting?
3. If a painting cost US\$18 per square inch and is 22 inches by 34 inches, what is the total purchase price?

4. If a painting cost US\$25 per square inch and its dimensions are 28 inches by 44 inches, what would be the sales price if the seller agreed to a 14% discount?

Calculating Area in Metric: Internationally dimensions are measured in centimeters and meters or Metric. One inch equals 2.54 centimeters and 39.37 inches equals 1 meter.

1. If a painting is 80 centimeters in height, what is its height in inches?
2. If a painting is 1.75 meters in height, what is its height in inches?
3. A painting is 40 centimeters wide and 60 centimeters high;
 - a. What are its dimensions in inches?
 - b. How many square centimeters does it contain?
4. A painting is 1.5 meters wide and 2.25 meters high;
 - a. What are its dimensions in inches?
 - b. How many square meters does it contain?
 - c. How many square inches does it contain?

Optional Activity:

Find the paintings listed below in the exhibit *What's In a Maritime Painting?* In the exhibition on the screen for every painting is an icon of dividers that look like the open portion of scissors. By clicking on this icon the width and height of each painting is displayed in American Standard and Metric dimensions.

Calculate the cost of each of the following paintings, first per square inch and then per square centimeter.

1. **'Nathaniel B. Palmer' Off Staten Island** (assume a price of \$75,000)
2. **The Whaling Bark 'Harmony' in Davis Straits** (assume a price of US\$25,000)
3. **"Sheffield' Approaching Liverpool** (assume a price of US\$30,000)
4. **Peary's Arctic Exploration Vessel, 'Roosevelt'** (assume a price of US\$25,000)
5. **Admiral Rodney's Fleet Deploying in the West Indies** (assume a price of \$50,000)