IM 6–8 MATH™ v.III

Unit 1
Scale Drawings

7

Lesson 11

Scales Without Units

Illustrative Mathematics®

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Learning Goal

Let's explore a different way to express scales.

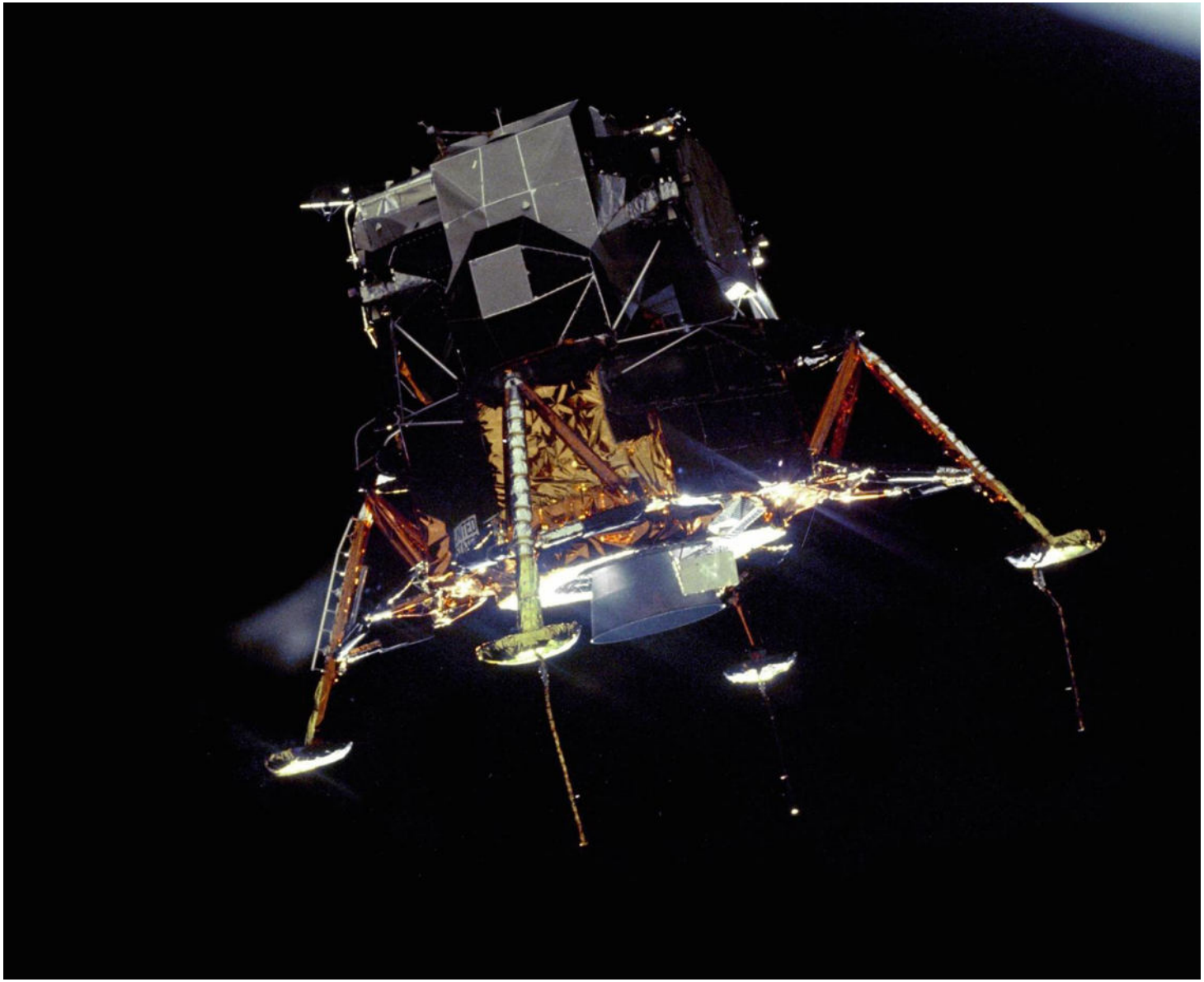
One to One Hundred

Warm-up

A map of a park says its scale is 1 to 100.

1. What do you think that means?
2. Give an example of how this scale could tell us about measurements in the park.

Apollo Lunar Module



Apollo Lunar Module

Your teacher will give you a drawing of the Apollo Lunar Module. It is drawn at a scale of 1 to 50.

1. The “legs” of the spacecraft are its landing gear. Use the drawing to estimate the actual length of each leg on the sides. Write your answer to the nearest 10 centimeters. Explain or show your reasoning.
2. Use the drawing to estimate the actual height of the Apollo Lunar Module to the nearest 10 centimeters. Explain or show your reasoning.
3. Neil Armstrong was 71 inches tall when he went to the surface of the Moon in the Apollo Lunar Module. How tall would he be in the drawing if he were drawn with his height to scale? Show your reasoning.
4. Sketch a stick figure to represent yourself standing next to the Apollo Lunar Module. Make sure the height of your stick figure is to scale. Show how you determined your height on the drawing.

Apollo Lunar Module

- Does it matter what unit we use to measure the drawing? Why or why not?
- Which unit is more efficient for measuring the height of the lunar module on the drawing—inches or centimeters?

Same Drawing, Different Scales

A rectangular parking lot is 120 feet long and 75 feet wide.

- Lin made a scale drawing of the parking lot at a scale of 1 inch to 15 feet. The drawing she produced is 8 inches by 5 inches.
- Diego made another scale drawing of the parking lot at a scale of 1 to 180. The drawing he produced is also 8 inches by 5 inches.

1. Explain or show how each scale would produce an 8 inch by 5 inch drawing.
2. Make another scale drawing of the same parking lot at a scale of 1 inch to 20 feet. Be prepared to explain your reasoning.
3. Express the scale of 1 inch to 20 feet as a scale without units. Explain your reasoning.

Scales Without Units

Lesson Synthesis

- What does it mean when the scale on a scale drawing does not indicate any units?
- How is a scale without units the same as or different from a scale with units?
- How can a scale without units be used to calculate scaled or actual distances?

Learning Targets

- I can explain the meaning of scales expressed without units.
- I can use scales without units to find scaled distances or actual distances.

Scaled Courtyard Drawings

Cool-down

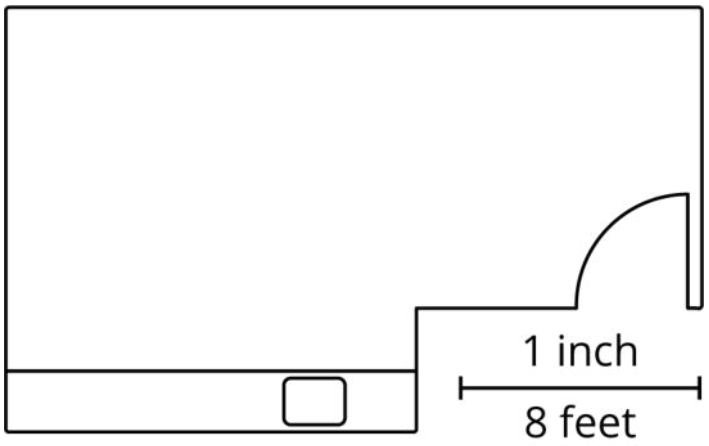
Andre drew a plan of a courtyard at a scale of 1 to 60. On his drawing, one side of the courtyard is 2.75 inches.

1. What is the actual measurement of that side of the courtyard? Express your answer in inches and then in feet.
2. If Andre made another courtyard scale drawing at a scale of 1 to 12, would this drawing be smaller or larger than the first drawing? Explain your reasoning.

scale

A scale tells how the measurements in a scale drawing represent the actual measurements of the object.

For example, the scale on this floor plan tells us that 1 inch on the drawing represents 8 feet in the actual room. This means that 2 inches would represent 16 feet, and $\frac{1}{2}$ inch would represent 4 feet.



scale drawing

A scale drawing represents an actual place or object. All the measurements in the drawing correspond to the measurements of the actual object by the same scale.