

Pre-Test

NAME _____ **DATE** _____

1. A model train has a scale of $\frac{1}{48}$. Answer each question and explain how you calculated your answers.
 - a. If the model engine is 14 inches long, how long is the actual train engine?

 - b. If a boxcar of the actual train is 38 feet long, how long is the model boxcar?

2. Bethany made a sketch of a mural she is going to paint. The sketch is a rectangle that is 8 inches by 11 inches. Determine the following possible sizes for the mural that maintain exactly the same shape.
 - a. 24 inches \times _____ inches

 - b. _____ inches \times 55 inches

 - c. 4 feet \times _____ feet

3. The Japanese flag has a height : length ratio of 2 : 3. If a Japanese flag is 150 centimeters high, what is its length in meters?

4. The scale factor for an action figure is 1 : 12. What does this mean?

5. Derek lives 13.5 miles from a shopping center. His map shows that $\frac{1}{2}$ inch is equivalent to 3 miles. How many inches apart are Derek's house and the shopping center on his map?
6. A blueprint has a scale of $\frac{1}{4}$ inch is equivalent to 1 foot. The blueprint shows the design of a room that is $4\frac{1}{2}$ inches long and $3\frac{1}{4}$ inches wide. What are the actual dimensions of the room?
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7. Justin is working with a microscope that magnifies objects to 175 times their actual size.
- What is the scale factor for the microscope?
 - The diameter of an amoeba cell is 0.30 millimeter. How big will the cell appear to Justin under the microscope?
 - The width of a fine human hair under Justin's microscope appears to be 12.25 millimeters. What is the width of the actual human hair?

Post-Test

NAME _____ **DATE** _____

1. A model of the DC-10 airplane has a scale of $\frac{1}{144}$. Answer each question and explain how you calculated your answers.
 - a. If the wingspan of the model is 13.75 inches long, how long is the wingspan of the actual plane?

 - b. If the DC-10 is 58 feet high, how high is the model?

2. Darius designed a billboard. The billboard is 480 inches long by 144 inches high. Darius used a computer to design the billboard. Determine the following possible sizes for his computer design that maintain exactly the same shape.
 - a. 12 inches \times _____ inches
 - b. _____ inches \times 2.4 inches
 - c. 2 feet \times _____ feet

3. The Haitian flag has a width : length ratio of 3 : 5. If a Haitian flag is 180 centimeters long, what is its width in meters?

4. The scale factor for an toy animal is 1 : 30. What does this mean?

5. J.P. lives 175 miles from his grandmother's house. His map shows that $\frac{1}{4}$ inch is equivalent to 10 miles. How many inches apart are J.P.'s house and his grandmother's house on his map?
6. A blueprint of a barn has a scale of $\frac{1}{16}$ inch is equivalent to 1 foot. What are the dimensions of the blueprint if the actual horse stall measures 12 feet by 16 feet?
7. Sara is working with a microscope that magnifies objects to 170 times their actual size.
- What is the scale factor for the microscope?
 - The diameter of a Staphylococcus bacterium is 0.001 millimeter. How big in will the cell appear to Sara under the microscope?
 - The diameter of an orchid seed under Sara's microscope appears to be 8.5 millimeters. What is the diameter of the actual orchid seed?

End of Chapter Test

NAME _____ **DATE** _____

1. A model of an aircraft carrier has a scale of $\frac{1}{700}$.
 - a. If the model is 18.5 inches long, how long is the actual aircraft carrier?

 - b. If the beam of the aircraft carrier is 252 feet long, how long is the beam on the model?

2. The length of the fuselage of an airplane is 170 feet. The length of the fuselage on a model of the plane is 21.25 inches. What is the scale for the model?

3. The scale factor for a model airplane is $\frac{1}{16}$. What does this mean?

4. Jose is making a model of an airplane that measures 34 feet tall and 108 feet long. If he uses a scale of 1 : 16, what will be the height and length of his model airplane?
5. Ellen designed a rectangular logo that measures 1.25 inches by 1.5 inches. Determine the following possible sizes for her logo that maintain exactly the same shape.
- a. 6 inches \times _____ inches
 - b. _____ inches \times 19.2 inches
 - c. 1 inch \times _____ inches
 - d. 42 inches \times _____ inches
6. The aspect ratio of a laptop monitor is 1.625 : 1. The aspect ratio of a monitor is the ratio of its width to its height.
- a. Write this as a ratio that involves only whole numbers, using the smallest whole numbers possible.
 - b. If the monitor is 15 inches wide, what is the height?

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7. The United States flag has a width : length ratio of 10 : 19.

a. If a U.S. flag is 25 inches high, what is its width?

b. If a U.S. flag is 30 inches wide, what is its height to the nearest tenth of an inch?

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8. The height of John Hancock Center in Chicago is 1128 feet. Kelsey made a scale model of this building at a scale of 1 : 200. Calculate the height of her model in inches to the nearest tenth of an inch. Explain your reasoning.

9. Which scale would produce the largest drawing? Explain your reasoning.

1 : 100

1 millimeter : 1 meter

1 inch : 10 feet

10. Answer each question about scale factors for scale models.
- If a scale model uses a scale factor of $100 : 9$, how you can tell whether the model is larger or smaller than the actual object?
 - If a scale model uses a scale factor of $3 : 50$, how you can tell whether the model is larger or smaller than the actual object?
 - In general, if a scale factor is written as a fraction, how can you tell whether the model is larger or smaller than the actual object?
11. A microscope has a scale of $200 : 1$.
- What does this scale mean?
 - The diameter of a red blood cell under magnification appears to be 0.15 centimeter. What is the diameter of the red blood cell in millimeters?
 - The width of a grain of table salt is 0.30 millimeter. What will be the width of the grain of salt in centimeters under magnification?

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12. Jacey is going camping 150 miles away from her home. Her map shows that $\frac{1}{2}$ inch is equivalent to 30 miles. How far is it from Jacey's house to the campground on her map?

13. A blueprint of a kitchen has a scale of $\frac{1}{8}$ inch is equivalent to 1 foot. If the pantry measures $\frac{1}{2}$ inch by $\frac{3}{4}$ inch on the blueprint, what are the actual dimensions of the pantry?

14. Ethan is planning to drive from Boston to Atlanta. He measured a distance of $6\frac{7}{8}$ inches between the two cities on the national map in his road atlas. A scale of 1 inch : 160 miles is displayed on this map.

a. What does this scale mean?

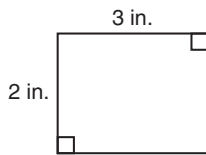
b. Based on this map and Ethan's measurement, calculate the driving distance between Boston and Atlanta. Explain your reasoning.

Standardized Test Practice

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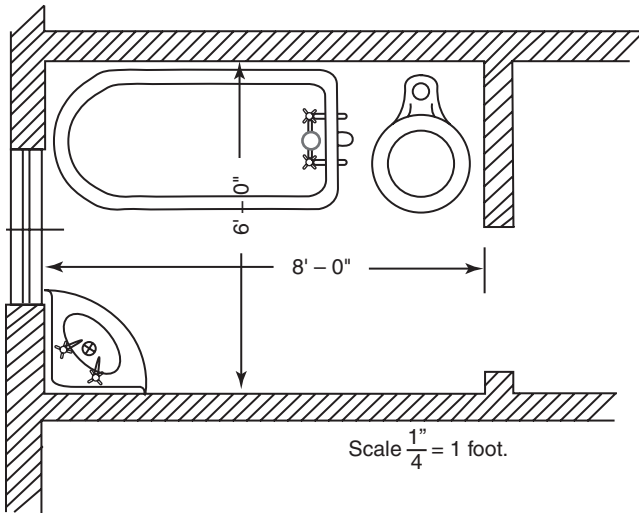
1. An anatomy model of an adult human is 7 inches tall. Most adult humans are between 5 feet and 6 feet tall. What is the approximate scale factor of the model?
 - a. $\frac{1}{20}$
 - b. $\frac{1}{10}$
 - c. 10
 - d. 20

2. Jan is enlarging the sketch shown on a photocopier. Which could be the dimensions of her enlargement?



- a. 4 inches \times 5 inches
 - b. 5 inches \times 6 inches
 - c. 7 inches \times 10.5 inches
 - d. 8 inches \times 9 inches
3. The scale on a drawing is 3 : 1. What does this mean?
 - a. The scale drawing is 31 times the size of the actual object.
 - b. The scale drawing is the same size as the actual object.
 - c. The scale drawing is three times the size of the actual object.
 - d. The scale drawing is one-third the size of the actual object.
 4. A billboard advertises a watch. The face of the watch is 2 meters wide on the billboard. The face of the actual watch is 2 centimeters wide. What is the scale factor of the billboard?
 - a. $\frac{1}{100}$
 - b. $\frac{1}{10}$
 - c. 10
 - d. 100

5. Danielle drew the following scale drawing of a bathroom.



What are the dimensions of the bathroom on her drawing?

- a. 1.5 inches \times 2 inches
- b. 4.5 inches \times 6 inches
- c. 15 inches \times 20 inches
- d. 24 inches \times 32 inches

6. A bathroom in a new home is 7 feet long. The blueprint of the bathroom is 12 inches long. What is the scale factor for the blueprint?

- a. $\frac{1}{12}$
- b. $\frac{1}{7}$
- c. 7
- d. 12

7. Jeremy is driving to a friend's house that is 72 miles away from his home. The scale on Jeremy's map is $\frac{1}{2}$ inch is equivalent to 8 miles. How far is it on the map from Jeremy's house to his friend's house?

- a. $3\frac{1}{2}$ inches
- b. $4\frac{1}{2}$ inches
- c. 5 inches
- d. 9 inches

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8. Mexico's flag has a height-to-length ratio is 4 : 7. If a Mexican flag is 28 feet long, what is its height?
- a. 16 feet
 - b. 25 feet
 - c. 49 feet
 - d. 112 feet
9. Which of the following would have a scale factor greater than 1?
- a. a doll house
 - b. a picture of a skyscraper
 - c. a map of the world
 - d. a diagram of a plant cell
10. Eric is building a scale model of a helicopter at a 1 : 72 scale. If the height of the model is $2\frac{2}{3}$ inches, what is the actual height of the helicopter?
- a. 16 feet
 - b. 27 feet
 - c. 48 feet
 - d. 192 feet
11. A diagram of a computer chip has a scale factor of 16 : 1. The chip is 24 centimeters wide on the diagram. How wide is the actual chip?
- a. 1.5 centimeters
 - b. 3.0 centimeters
 - c. 8.0 centimeters
 - d. 48 centimeters

12. Leah is an interior designer. She will use the following scale drawing to two bedrooms and a shared bathroom to create her designs for her client.



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What are the dimensions of the outer rectangle in Leah's scale drawing?

- a. $3\frac{3}{8}$ inches \times $5\frac{5}{8}$ inches
 - b. $5\frac{5}{8}$ inches \times 9 inches
 - c. $6\frac{3}{4}$ inches \times $5\frac{5}{8}$ inches
 - d. 15 inches \times 24 inches
13. The German flag has a height : length ratio of 3 : 5. If a German flag is 1.75 meters high, what is its length?
- a. 2.8 meters
 - b. 1.09 meters
 - c. 2.8 meters
 - d. 2.92 meters
14. The aspect ratio of a screen is the ratio of its width to its height. The aspect ratio for HDTV is 1.78 : 1. If an HDTV screen has a height of 28 inches, what is its width to the nearest inch?
- a. 16 inches
 - b. 48 inches
 - c. 49 inches
 - d. 50 inches

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15. Amanda is building a dollhouse that is a scale model of her real house with a scale factor of $\frac{1}{20}$. In her real house, the kitchen measures 10 feet \times 12 feet. How big should she make the kitchen in the dollhouse?
- a. 10 inches \times 12 inches
 - b. 0.84 inch \times 1 inch
 - c. 6 inches \times 7.2 inches
 - d. 5 inches \times 6 inches
16. Which scale would produce the largest scale drawing of an object when compared to the actual object?
- a. 1 inch : 5 feet
 - b. 1 inch : 30 inches
 - c. 1 foot : 12 yards
 - d. 1 centimeter : 1 meter
17. Which expresses the aspect ratio 1.75 : 1 using only whole numbers?
- a. 11 : 7
 - b. 8 : 5
 - c. 4 : 7
 - d. 7 : 4
18. The driving distance between Chicago and New Orleans is 927 miles. Shamim is using a road atlas that contains a national road map with scale 1 inch : 150 miles. What is the distance between Chicago and New Orleans on this map to the nearest tenth of an inch?
- a. 0.2 inch
 - b. 6.0 inches
 - c. 6.2 inches
 - d. 7.8 inches

19. A human cheek cell with diameter 0.06 millimeter appears to have a diameter of 0.09 centimeter under a microscope. What is the power of the microscope? (A microscope with power $100\times$ magnifies objects to 100 times their actual size.)
- a. $150\times$
 - b. $50\times$
 - c. $15\times$
 - d. $1.5\times$
20. The height of Hancock Place in Boston is 790 feet. If you build a scale model of this building at a 1 : 125 scale, how tall will the model be?
- a. 6.32 inches
 - b. 15.8 feet
 - c. 6.32 feet
 - d. 7.9 feet