GRADE 7 · UNIT 5 · UNIT REVIEW

# Unit 5 Review

**MA.7.DP.1.3, MA.7.GR.1.5**

I can make every kind of prediction and every kind of scale calculation the test will ask for.

# Warm-Up

1. Map 1 in. : 20 mi. Towns 4.5 in. apart. Real distance?
2. A 36 $cm^2$ shape is scaled by k = 1/3. New area?
3. In a random sample, 30% said yes. Predict for 7,000.
4. Sample: 3 of 25 members walk. 48 walk in all. Members?

# Warm-Up

1. Map 1 in. : 20 mi. Towns 4.5 in. apart. Real distance? **90 mi**
2. A 36 $cm^2$ shape is scaled by k = 1/3. New area? **4 $cm^2$**
3. In a random sample, 30% said yes. Predict for 7,000. **2,100**
4. Sample: 3 of 25 members walk. 48 walk in all. Members?

   **400**

# Vocabulary

**sample fraction**

the part, over the whole sample — never over the rest

**scale factor**

image over original, no units; lengths times k, areas times $k^2$

# Notes

## I. Samples: which number is missing?

Part missing — sample fraction times population. (5.01–5.03)

Population missing — scale the sample's fraction up to the count you know. (5.04)

Tagging — the catch's tagged fraction is the whole's. (5.04)

# Notes

## II. Scale: length or area?

k = image ÷ original — no units. (5.05)

**Lengths and perimeters times k. Areas times $k^2$.**

A scale with units is not a factor until both lengths share a unit. (5.08)

# Notes

## III. The two traps that cost the most points

1. **Part over the rest, instead of part over the whole sample.**

2. **Area times k, instead of k squared.**

# Example 1

A random sample of 96 of a school's 1,600 students found 24 who walk to school.

**Predict the number who walk.**

# Example 1

$$\frac{24}{96} = \frac{1}{4}$$

$$\frac{1}{4} \cdot 1{,}600 = 400$$

**Answer: About 400 students**

# Your Turn

A random sample of 80 of a school's 1,200 students found 30 who play a sport.

Predict the number who play a sport.

# Your Turn

A random sample of 80 of a school's 1,200 students found 30 who play a sport.

Predict the number who play a sport.

$$\frac{30}{80} = \frac{3}{8}$$

$$\frac{3}{8} \cdot 1{,}200 = 450$$

**Answer: About 450 students**

# Example 2

A plan uses 1 in. : 5 ft. A room is 7 in. by 4 in. on the plan.

**Find the room's real area.**

# Example 2

$7 \cdot 4 = 28$

$28 \cdot 25 = 700$

**Answer: 700 $ft^2$**

# Your Turn

A plan uses 1 in. : 3 ft. A room is 6 in. by 5 in. on the plan.

Find the room's real area.

# Your Turn

A plan uses 1 in. : 3 ft. A room is 6 in. by 5 in. on the plan.

Find the room's real area.

Real sides: $6 \cdot 3 = 18$ and $5 \cdot 3 = 15$

Area: $18 \cdot 15 = 270$

**Answer: 270 $ft^2$**

# Whiteboards · Question 1 of 9

A random sample of 90 students found 27 who play an instrument.

**Write the sample fraction in lowest terms.**

**Answer it.**

# Whiteboards · Question 1 of 9

A random sample of 90 students found 27 who play an instrument.

**Write the sample fraction in lowest terms.**

27 of 90: $\frac{27}{90}$

Divide top and bottom by 9: $\frac{27}{90} = \frac{3}{10}$

**Answer:** $\frac{3}{10}$

# Whiteboards · Question 2 of 9

Same sample: 27 of 90 play an instrument. The school has 2,400 students.

**Predict how many of the 2,400 play an instrument.**

**Answer it.**

# Whiteboards · Question 2 of 9

Same sample: 27 of 90 play an instrument. The school has 2,400 students.

**Predict how many of the 2,400 play an instrument.**

$$\frac{27}{90} = \frac{3}{10}$$

$$\frac{3}{10} \cdot 2{,}400 = 720$$

**Answer: About 720**

# Whiteboards · Question 3 of 9

In 60 random draws, 18 were blue and 42 were not.

**What fraction of the draws were blue?**

**A.** $\frac{42}{60}$

**B.** $\frac{60}{18}$

**C.** $\frac{18}{60}$

**D.** $\frac{18}{42}$

**Answer it.**

# Whiteboards · Question 3 of 9

In 60 random draws, 18 were blue and 42 were not.

**What fraction of the draws were blue?**

Blue draws on top: 18. All the draws on the bottom: 60.

**Answer: C — 18 of the 60**

# Whiteboards · Question 4 of 9

A ranger tags 36 birds. Later 140 are caught at random and 12 are tagged.

**Estimate the number of birds.**

**Answer it.**

# Whiteboards · Question 4 of 9

A ranger tags 36 birds. Later 140 are caught at random and 12 are tagged.

**Estimate the number of birds.**

Tagged fraction of the catch: $\frac{12}{140} = \frac{3}{35}$

$36 = 3 \cdot 12$

$\frac{3}{35} = \frac{36}{420}$, so the whole is $35 \cdot 12 = 420$

**Answer: About 420**

# Whiteboards · Question 5 of 9

A side of 10 cm becomes 45 cm in a scaled copy.

**Find the scale factor from the original to the copy.**

**Answer it.**

# Whiteboards · Question 5 of 9

A side of 10 cm becomes 45 cm in a scaled copy.

**Find the scale factor from the original to the copy.**

Scale factor = copy ÷ original

$45 \div 10 = 4.5$

**Answer: 4.5**

# Whiteboards · Question 6 of 9

A figure is scaled by k = 6.

**Which is true?**

**A.** perimeter times 6, area times 36

**B.** perimeter times 6, area times 6

**C.** perimeter times 36, area times 36

**D.** perimeter times 36, area times 6

**Answer it.**

# Whiteboards · Question 6 of 9

A figure is scaled by k = 6.

**Which is true?**

Perimeter is a length: multiply by 6.

Area uses two lengths: $6 \cdot 6 = 36$

**Answer: A — perimeter times 6, area times 36**

# Whiteboards · Question 7 of 9

Over 3 revisions, a figure of area 60 cm² was scaled by k = 1.5.

**Find the new area.**

**Answer it.**

# Whiteboards · Question 7 of 9

Over 3 revisions, a figure of area 60 cm² was scaled by k = 1.5.

**Find the new area.**

$$k \cdot k = 1.5 \cdot 1.5 = 2.25$$

$$60 \cdot 2.25 = 135$$

**Answer: 135 cm²**

# Whiteboards · Question 8 of 9

A plan uses the scale 1 cm : 9 m.

**Write the scale factor from the plan to the real thing.**

**Answer it.**

# Whiteboards · Question 8 of 9

A plan uses the scale 1 cm : 9 m.

**Write the scale factor from the plan to the real thing.**

Same units first: 9 m = 900 cm

1 cm : 900 cm, so the scale factor is 900.

**Answer: 900**

# Whiteboards · Question 9 of 9

Every side of a rectangle is multiplied by 9.

**Explain why its area is multiplied by 81, not 9.**

**Write your answer in sentences.**

# Whiteboards · Question 9 of 9

Every side of a rectangle is multiplied by 9.

**Explain why its area is multiplied by 81, not 9.**

$$\text{New area} = (9 \cdot \text{length})(9 \cdot \text{width})$$

$$9 \cdot 9 = 81, \text{ so it is } 81 \cdot (\text{length} \cdot \text{width}).$$

**Answer: Both length and width are multiplied by 9, so the area is multiplied by 81.**

# Independent Practice

1. In a random sample, 45% of voters said yes. The town has 3,800 voters. Predict the yes votes.

2. A random sample of 50 of a club's members found 6 who walk, and 72 walk in all. How many members does the club have?

3. On a plan, 3 cm stands for 2 m. A wall is 18 cm on the plan. How long is the real wall?

4. A figure with area 50 $in^2$ is scaled by k = 3. Find the new area.

5. A map uses 1 in. : 25 mi. Two towns are really 150 mi apart. How far apart on the map?

6. A model is built at 1 : 20. The real van is 6 m long. How long is the model, in centimeters?

# Before You Go

Which number is missing? Which rule — length or area?

Every test question is one of today's shapes, with new numbers.

The practice test is your review for the test.

# IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Every Unit 5 skill is due by the test: bring any still under 60 up to it.

**Today's skills — all required**

Use collected data to make predictions (EXS)

Scale drawings: word problems (84H)