GRADE 7 · UNIT 5 · LESSON 3

Making Population Predictions — Part 1

MA.7.DP.1.3

I can predict for a whole population from a sample given as a count or as a percent.

Warm-Up

1. 15 reds in 60 spins. Predict reds in 800 spins.
2. Circumference of a circle, radius 5 m. Use $\pi = 3.14$
3. Find the range: 31, 18, 45, 27, 22
4. What is 12% of 350?

Warm-Up

1. 15 reds in 60 spins. Predict reds in 800 spins. **200**
2. Circumference of a circle, radius 5 m. Use $\pi = 3.14$ **31.4 m**
3. Find the range: 31, 18, 45, 27, 22 **27**
4. What is 12% of 350? **42**

Vocabulary

prediction

a fraction of a sample, applied to the whole population

percent

a fraction out of 100 — already the fraction you need

Notes

I. From a count

A random sample of 600 bulbs: 6 are faulty. The shipment holds 4,300 bulbs.

$$\frac{6}{600} = \frac{1}{100} \qquad \frac{1}{100} \cdot 4{,}300 = 43$$

About 43 faulty bulbs in the shipment.

Notes

II. From a percent — one move, not two

In a random sample of 400 voters, 30% said yes. The county has 6,228 voters.

$$0.30 \cdot 6{,}228 = 1{,}868.4$$

The 400 who were polled is not needed once you have the percent.

1,868.4 people is not a number of people — say about 1,868.

Notes

III. Check the sample first

Was it random? (5.01: every member has the same chance.)

Was it drawn from the population you are predicting about?

30 students in one class speak for that class — not for the school, and not for the state.

Example 1

A random sample of 500 lamps was tested. 15 were faulty.

A warehouse holds 2,400 lamps.

About how many in the warehouse are faulty?

Example 1

$$\frac{15}{500} = \frac{3}{100} = 3\%$$

$$0.03 \cdot 2{,}400 = 72$$

Answer: About 72 lamps

Your Turn

A random sample of 450 bolts was checked; 9 were bent.

Predict the number bent in 6,000 bolts.

Your Turn

A random sample of 450 bolts was checked; 9 were bent.

Predict the number bent in 6,000 bolts.

$$\frac{9}{450} = \frac{1}{50}$$

$$\frac{1}{50} \cdot 6{,}000 = 120$$

Answer: About 120 bolts

Example 2

In a random sample of 250 voters, 40% said yes.

The city has 5,817 voters.

About how many of the city's voters would say yes?

Example 2

$0.40 \cdot 5{,}817 = 2{,}326.8$

$2{,}326.8 \approx 2{,}327$

Answer: About 2,327 voters

Your Turn

In a random sample, 45% of shoppers used a coupon.

The store serves 3,164 shoppers a week. Predict how many use a coupon.

Your Turn

In a random sample, 45% of shoppers used a coupon.

The store serves 3,164 shoppers a week. Predict how many use a coupon.

$45\% = 0.45$

$0.45 \cdot 3{,}164 = 1{,}423.8$

About 1,424

Answer: About 1,424 shoppers

Whiteboards · Question 1 of 9

In a random sample of 280 pens, 14 were dry.

What fraction of the pens were dry? Write it in lowest terms.

Answer it.

Whiteboards · Question 1 of 9

In a random sample of 280 pens, 14 were dry.

What fraction of the pens were dry? Write it in lowest terms.

14 of 280: $\frac{14}{280}$

Divide top and bottom by 14: $\frac{14}{280} = \frac{1}{20}$

Answer: $\frac{1}{20}$

Whiteboards · Question 2 of 9

Same test: 14 dry in 280. The order holds 3,400 pens.

Predict the number of dry pens in the order.

Answer it.

Whiteboards · Question 2 of 9

Same test: 14 dry in 280. The order holds 3,400 pens.

Predict the number of dry pens in the order.

$$\frac{14}{280} = \frac{1}{20}$$

$$\frac{1}{20} \cdot 3{,}400 = 170$$

Answer: About 170

Whiteboards · Question 3 of 9

In a random sample of 250 phones, 40 had a cracked screen. A district owns 3,000 phones.

Which set-up predicts the cracked ones?

A. $\frac{40}{250} \cdot 3{,}000$

B. $\frac{40}{210} \cdot 3{,}000$

C. $\frac{40}{3{,}000} \cdot 250$

D. $\frac{250}{40} \cdot 3{,}000$

Answer it.

Whiteboards · Question 3 of 9

In a random sample of 250 phones, 40 had a cracked screen. A district owns 3,000 phones.

Which set-up predicts the cracked ones?

Cracked in the sample: 40 of 250, so $\frac{40}{250}$

$$\frac{40}{250} \cdot 3{,}000 = 480$$

Answer: A — 40 of the 250 tested, times 3,000

Whiteboards · Question 4 of 9

In a random sample of a race's runners, 70% wore a hat. The race has 3,846 runners.

Predict the number of runners who wore a hat.

Answer it.

Whiteboards · Question 4 of 9

In a random sample of a race's runners, 70% wore a hat. The race has 3,846 runners.

Predict the number of runners who wore a hat.

$70\% = 0.70$

$0.70 \cdot 3{,}846 = 2{,}692.2$

About 2,692

Answer: About 2,692

Whiteboards · Question 5 of 9

A random sample of 300 of a town's 2,400 households found 45 with two cars.

Predict the number of households with two cars.

Answer it.

Whiteboards · Question 5 of 9

A random sample of 300 of a town's 2,400 households found 45 with two cars.

Predict the number of households with two cars.

$$\frac{45}{300} = \frac{3}{20}$$

$$\frac{3}{20} \cdot 2{,}400 = 360$$

Answer: 360

Whiteboards · Question 6 of 9

A random sample of 34 families on one street was surveyed.

Whom can it predict for?

A. Every family in Florida.

B. The families on that street.

C. No one — 34 families are too few.

D. Any group of 34 families.

Answer it.

Whiteboards · Question 6 of 9

A random sample of 34 families on one street was surveyed.

Whom can it predict for?

The 34 came from one street.

A sample speaks only for the group it was drawn from.

Answer: B — the families on that street

Whiteboards · Question 7 of 9

Across 7 shifts, a factory checked a random sample of 140 of its 3,000 parts: 21 failed.

Predict the number of parts that fail.

Answer it.

Whiteboards · Question 7 of 9

Across 7 shifts, a factory checked a random sample of 140 of its 3,000 parts: 21 failed.

Predict the number of parts that fail.

$$\frac{21}{140} = \frac{3}{20}$$

$$\frac{3}{20} \cdot 3{,}000 = 450$$

Answer: 450

Whiteboards · Question 8 of 9

In a random sample of 700 seeds, 84 did not sprout. A farm plants 5,500 seeds.

Predict the number of seeds that do not sprout.

Answer it.

Whiteboards · Question 8 of 9

In a random sample of 700 seeds, 84 did not sprout. A farm plants 5,500 seeds.

Predict the number of seeds that do not sprout.

$$\frac{84}{700} = \frac{3}{25}$$

$$\frac{3}{25} \cdot 5{,}500 = 660$$

Answer: 660

Whiteboards · Question 9 of 9

A prediction from a random sample came out 2,692.2 runners.

What do you write down, and why is even that not exact?

Write your answer in sentences.

Whiteboards · Question 9 of 9

A prediction from a random sample came out 2,692.2 runners.

What do you write down, and why is even that not exact?

There is no 0.2 of a runner, so round: 2,692.

It came from a sample, so it is still an estimate.

Answer: About 2,692 — and it is still an estimate.

Independent Practice

1. A random sample of 350 batteries: 7 were dead. Write the fraction in lowest terms.

2. A crate holds 2,600 batteries. Use that fraction to predict the number that are dead.

3. In a random sample, 22% of drivers said they use the toll road. The county has 4,500 drivers. Predict how many use it.

4. Over 6 days, a random sample of 240 apples was graded; 36 were bruised. Predict the bruised apples in 1,800.

5. A club surveys its own 30 members about a school rule, then predicts for all 900 students. What is wrong, and what may the sample predict for?

6. A random sample of 650 tickets: 52 were winners. Predict the winners in 5,200 tickets, then say in one sentence why the answer is an estimate.

Before You Go

A percent is the fraction, already written.

A sample predicts for the population it came from — and no other.

Next class: the same proportion, run backwards.

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. Due by the Unit 5 test.

Today's skills — all required

Make an estimate from sample data (FMC)

Use collected data to make predictions (EXS)