Estimating from a Sample

ANSWERS

1 A cinema has 4000 members. It wants to know how many would like a film club, so it asks 50 of its members.

(a) What is the population?
(b) What is the sample?

(a) all 4000 members

(b) the 50 members asked

2 A garden centre sold 1200 plants in May. In a random sample of 40 of these plants, 9 were herbs. Estimate how many of the 1200 plants were herbs.

	Herbs	Total
Sample	9	40
May	270	1200

× 30

Estimate 270

3 A train company ran 2400 trains in March. In a random sample of 60 of these trains, 7 were late. Estimate how many of the 2400 trains were late.

	Late	Total
Sample	7	60
March	280	2400

× 40

Estimate 280

4 A theme park had 4500 visitors on Saturday. In a random sample of 90 visitors, 31 went on the water ride. Estimate how many of the visitors went on the water ride.

	Water ride	Total
Sample	31	90
Saturday	1550	4500

× 50

Estimate 1550

5 A factory makes 5600 phones a day. A random sample of 70 phones is tested, and 3 have a cracked screen. Estimate how many of the 5600 phones have a cracked screen.

5600 ÷ 70 = 80, and 3 × 80

Estimate 240

6 Owen wants to estimate how many of the 1500 students at his school have school dinners. He asks the first 40 students in the dinner queue.

(a) Explain why his sample is biased.
(b) Would his estimate be too high or too low?

(a) everyone in the queue has school dinners

(b) too high

7 A festival has 8000 visitors. Asha asks 25 visitors and 6 came by train. Femi asks 200 visitors and 38 came by train.

Work out both estimates for the number who came by train.
Whose estimate is more reliable? Why?

Asha 1920 **Femi** 1520

Answer Femi's: his sample is bigger

8 A gym has 1600 members. In a random sample of 32 members, 5 swim. Jack estimates that 5 × 32 = 160 members swim. Explain his mistake, then find the right estimate.

32 is the sample size, not the multiplier

Estimate 1600 ÷ 32 = 50, 5 × 50 = 250

Estimating from a Sample *further practice*

ANSWERS

9 A dentist has 2700 patients. In a random sample of 45 patients, 14 need a filling. Estimate how many of the 2700 patients need a filling.

2700 ÷ 45 = 60, and 14 × 60

Estimate 840

10 A bus company asked a random sample of its passengers how they pay. It has 6400 passengers a day. Estimate how many of them pay with a bus pass.

Card	Cash	Bus pass	Total
47	9	24	80

6400 ÷ 80 = 80, and 24 × 80

Estimate 1920

11 A shop wants to know if its customers would buy umbrellas. It asks 60 customers, all on a rainy Saturday. Explain why the sample is biased.

Answer on a rainy day more people want an umbrella

12 A cinema asked a random sample of 60 of its 3000 customers which snack they buy. Estimate how many more of the 3000 customers buy popcorn than sweets.

Popcorn	Sweets	No snack	Total
27	18	15	60

3000 ÷ 60 = 50, and (27 − 18) × 50

Estimate 450

13 There are 600 students in Zoe's year. She asks 4 of them, and 3 walk to school.

(a) Use her sample to estimate how many walk to school.

(b) Why is her estimate not reliable?

(a) 450

(b) the sample is too small

14 A head teacher wants a random sample of 50 of the 1000 students at her school. Which way gives a random sample?

A Ask the first 50 students through the gate.

B Pick 50 names at random from the register.

C Ask the 50 students in the chess club.

Answer B: everyone has the same chance

15 Ali says more than half of the 2400 people in his village recycle glass. In a random sample of 120 people, 54 recycle glass. Use the sample to decide if Ali is right.

2400 ÷ 120 = 20, and 54 × 20 = 1080

Answer No: 1080 is less than 1200

16 A train company has 9000 passengers a day. It asks 60 passengers at 8am on a Monday, and 51 are going to work.

(a) Estimate how many of the 9000 passengers are going to work.

(b) Is the real number likely to be higher or lower? Explain.

(a) 7650

(b) lower: 8am trains are mostly people going to work