

Making Predictions

Name: Key

Accelerated 7th Grade Math

If the 255 total freshman at the high school, a random sample was taken of 75 freshmen. Each of the freshmen took a 2-question survey and the results are as follows:

1. Which lunch do you prefer?

First	Second	Third
25	36	14

2. What hour do you have the hardest time staying awake in?

First	Second	Third	Fourth	Fifth	Sixth
15	8	2	14	16	20

Answer the following questions and SHOW YOUR WORK (even if you think you can do it in your head).

1. Based on this survey, predict how many freshmen would prefer second lunch.

$$\begin{aligned} \text{Sample Fresh} \frac{2^{\text{nd}} 36}{75} &= \frac{x}{255} \text{ Total Fresh} \\ 75x &= 9,180 \\ x &= 122.4 \end{aligned}$$

About 122 students would prefer 2nd lunch.

2. Approximately, how many freshmen feel that sixth hour is the hardest to stay awake in?

$$\begin{aligned} \text{Sample Fresh} \frac{6^{\text{th}} 20}{75} &= \frac{x}{255} \text{ Total Fresh} \\ 75x &= 5,100 \\ x &= 68 \end{aligned}$$

About 68 students feel that 6th hr is hardest to stay awake in.

3. Approximately how many freshmen do you predict feel that first hour is the hardest to stay awake in?

$$\begin{aligned} \text{Sample Fresh} \frac{1^{\text{st}} 15}{75} &= \frac{x}{255} \text{ Total Fresh} \\ 75x &= 3,825 \\ x &= 51 \end{aligned}$$

About 51 students feel that 1st hr is hardest to stay awake in.

Finding the Total Population

- 1) Suppose you wanted to know approximately how many bees were in a hive. Obviously you don't want to count every single bee, so you take a small sample of the bee hive. Your sample has 30 bees in it. On each of the bees in the sample, you made a small identifiable mark with a white marker. You then release these "tagged" bees back into the larger population of the hive. After some time under which you believe the tagged bees from the sample have mixed back in with the population of the hive, you take another sample. This second sample had 80 bees in it. In this second sample there are 10 of the tagged bees from the first sample. Write and solve a proportion to determine how many bees are in the hive.

$$\begin{array}{l} \text{1st} \\ \text{Sample} \end{array} \begin{array}{l} \text{Pop} \rightarrow x \\ \text{Tag} \rightarrow 30 \end{array} = \frac{80 \leftarrow \text{Pop 2nd}}{10 \leftarrow \text{Tag sample}}$$
$$10x = 2,400$$
$$x = 240$$

There are 240 bees in the hive

- 2) Biologists tag fish to make predictions about fish populations in certain bodies of water. A biologist catches and tags 25 trout from a small lake, then throws them back. The next day, the biologist catches another 20 trout and 4 of those were tagged. Approximate the total number of trout in the lake.

$$\begin{array}{l} \text{1st} \\ \text{Sample} \end{array} \begin{array}{l} \text{Pop} \rightarrow x \\ \text{Tag} \rightarrow 25 \end{array} = \frac{20 \leftarrow \text{Pop 2nd}}{4 \leftarrow \text{Tag sample}}$$
$$4x = 500$$
$$x = 125$$

There are 125 trout in the lake.

- 3) A biologist needs to estimate the frog population in a large pond. She captures 75 frogs, tags them, and then releases them back into the pond. One week later she captures 50 frogs and observes that 7 are tagged. About how many frogs are in the pond?

$$\begin{array}{l} \text{1st} \\ \text{Sample} \end{array} \begin{array}{l} \text{Pop} \rightarrow x \\ \text{Tag} \rightarrow 75 \end{array} = \frac{50 \leftarrow \text{Pop 2nd}}{7 \leftarrow \text{Tag sample}}$$
$$7x = 3,750$$
$$x = 536$$

About 536 frogs in the pond.

- 4) You tag 312 deer and release them back in the wild. A year later, you collect a sample of 1,200 deer, 98 of which are tagged. Estimate the total deer population in that area.

$$\begin{array}{l} \text{1st} \\ \text{Sample} \end{array} \begin{array}{l} \text{Pop} \rightarrow x \\ \text{Tag} \rightarrow 312 \end{array} = \frac{1,200 \text{ Pop 2nd}}{98 \text{ Tag sample}}$$
$$98x = 374,000$$
$$x = 3,820$$

There are about 3,820 deer in the population.