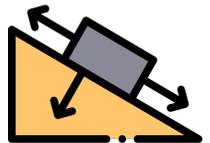




Helping With Math

Drawing Inferences About A Population With An Unknown Characteristic

GRADE 7



When we were young, we often make inferences. For example, you and your mom went to a place with a lot of people watching and cheering, a lot of seats all around and you see basketball players at the center of the basketball court. One thing came to your mind is that you are at a basketball match. Inference is a conclusion that we make based on the available facts or evidences.



Hi! I'm Coach Jim. Come and let's play some sports!

Drawing inferences is very important especially in dealing with large number of population or sample data. In this worksheet, you will further understand how to draw inferences about a population with an unknown characteristics.



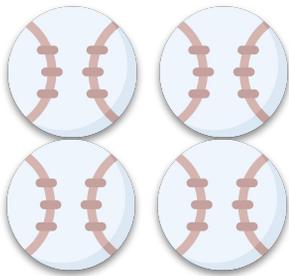
INFERENCE

For you to further understand the topic, let's recall the definition of the following statistical terms.



- **Inference** - is a conclusion you draw about something using the data and information that you have.
- **Population** - Usually represents by N . It refers to the totality of all elements or individuals that have something in common.
- **Sample** - a set of data selected from population by a sampling procedure. It is smaller than population and can be easily managed and studied.

Let's try to draw inferences based on the given objects below.



Inferences:

- There are more golf ball and baseball than basketball.
- There are about $\frac{1}{3}$ as many basketball as golf ball.
- Golf ball has the most number compared to the baseball and basketball.



USING DOT PLOT

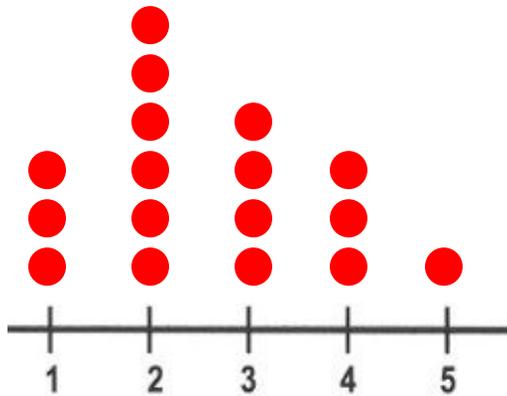
What is a *Dot Plot*?

- Using Dot Plot will help you draw inferences easily.
- It is a statistical chart showing the distribution of data points where each point represents a value.

Example:

A random sample of 17 students at HWM University are asked how many gadgets they own. Their answers are written in order below.

1,1,1,2,2,2,2,2,2,3,3,3,3,4,4,4,5



Note: Count how many times the number 1 appeared in the given data. The number of red points above the 1 in the number line represents how many times the number 1 appeared in the given set of data. Each red point represents one data value.

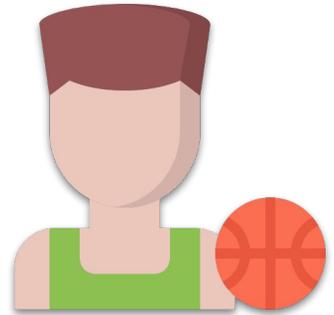
So, what are my Inferences?

- Most students have at least 1 gadget.
- Most students have between 1 and 5 gadgets.
- None of the students asked has greater than 5 gadgets.
- There are more students who own 2 gadgets than the students who own 5 gadgets.



DRAWING INFERENCES USING RATIO AND PROPORTION

We can also draw inferences using the concept of ratio and proportion.



Example:

The president of the sports club surveyed a random sample of 24 members out of 180 members of the club to choose what is the best day to celebrate sports festival in their school.



Monday	Tuesday	Wednesday
6	10	8

The president wants to know the estimate number of members who would likely choose Monday, Tuesday and Wednesday so she can report it to their adviser.

For Monday:

$$\frac{6}{24} = \frac{x}{180}$$

$$x = \frac{6(180)}{24}$$

$$x = 45$$

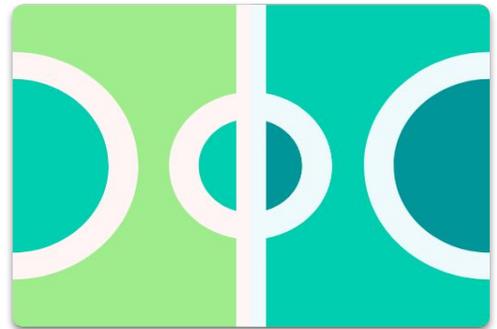
According to the given data, there are 6 members who chose Monday.

There are 24 members who randomly asked.

All the members has a total number of population of 180.

Therefore, **45 members** would likely choose Monday.





Apply the same method to calculate the number of members who would likely choose Tuesday and Wednesday.

For Tuesday:

$$\frac{10}{24} = \frac{x}{180}$$

$$x = \frac{10(180)}{24}$$

$$x = 75$$

For Wednesday:

$$\frac{8}{24} = \frac{x}{180}$$

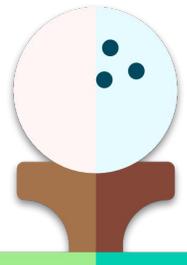
$$x = \frac{8(180)}{24}$$

$$x = 60$$

Therefore, **75 members** would likely choose Tuesday and **60 members** would likely choose Wednesday..

Now, we will use the concept of percentage to draw inferences.

Using the previous problem, we know that 6 members chose Monday, 10 members chose Tuesday, lastly, 8 members chose Wednesday.



Find the percentage of members in the sample that prefer each day.



Solve for the total number of members using the percentage.

Monday: $\frac{6}{24} \times 100\% = 25\%$



$$0.25 \times 180 = 45 \text{ members}$$

Tuesday: $\frac{10}{24} \times 100\% = 41.67\%$



$$0.4167 \times 180 = 75 \text{ members}$$

Wednesday: $\frac{8}{24} \times 100\% = 33.33\%$



$$0.3333 \times 180 = 60 \text{ members}$$



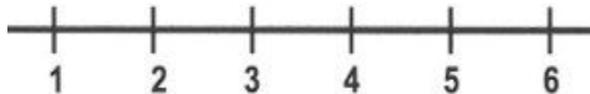
LET'S PRACTICE!

Read and analyze the problem below. Create a Dot Plot to answer.



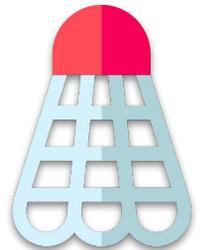
Joshua surveyed a random sample of 18 athletes about the number of t-shirts they bring during everyday training. Below is their answers in order.

1,1,2,2,2,3,3,4,4,4,4



Give four inferences:

1



2

3

4

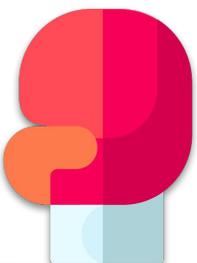


TABLE OF ACTIVITIES

- 1.) Badminton Match
- 2.) Basketball Training
- 3.) Golf Course
- 4.) Soccer Players
- 5.) Beach Volleyball
- 6.) Baseball Stadium
- 7.) Archers Aim For Gold
- 8.) Broken Skateboard
- 9.) All About Boxing
- 10.) Cycling Safety Gears



BADMINTON MATCH

Badminton match is fast approaching. To cheer up for Ken, read and analyze the following problems carefully. Create a Dot Plot and use it to draw 2 inferences for each situation.

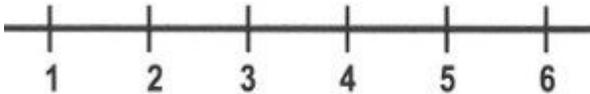
Jake surveyed a random sample of 15 students about how many sports each of them play. Below is their answers in order.

1,1,1,2,2,2,2,3,3,4,4,5,5,5,5,5,6



1.) Inference 1:

2.) Inference 2:

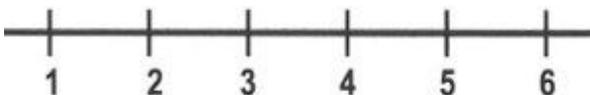


Hanz surveyed a random sample of 12 athletes about how many bottle of energy drink they consume in a day. Below is their answers.

2,2,2,3,3,3,3,4,4,4,5,5

3.) Inference 1:

4.) Inference 2:



BASKETBALL TRAINING

Before you attend your basketball training, answer the following first. Read each problem and analyze carefully. Show your solution on the space provided.

1.) Jon surveyed a random sample of 50 athletes in Trinity University about the amount of time they practice. Of the athletes, 12 are practicing more than 6 hours a day. There are 350 athletes in Trinity University.

What is the most reasonable estimate for the number of athletes of Trinity University who practice for more than 6 hours a day?



2.) TJ's sports club surveyed a random sample of 45 athletes about their running habits. 16 of the athletes said they run for 4 days a week. There are 360 athletes in TJ's sports club.

What is the most reasonable estimate for the number of TJ's sports club who run for 4 days a week?



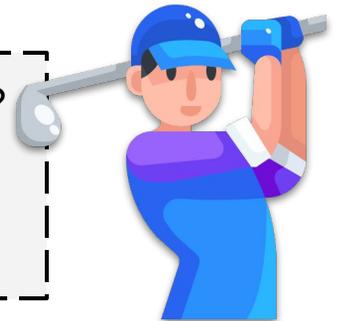
GOLF COURSE

If you managed to answer the following, you can play golf at the popular HWM Golf Course for free. Read and answer the problem below. Apply ratio and proportion to answer the questions. Show your solution on the space provided.

The adviser of the sports club wants to know the estimate number of students who will join volleyball, badminton and basketball. There are 560 members of the sports club but the adviser randomly selected only 75 members.



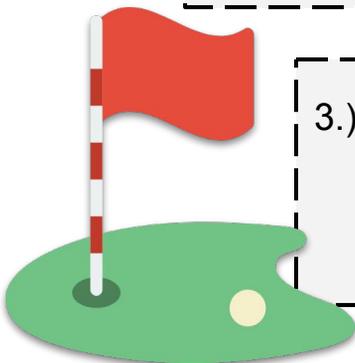
volleyball	badminton	basketball
24	15	36



1.) How many students would likely join volleyball?

2.) How many students would likely join badminton?

3.) How many students would likely join basketball?



SOCCER PLAYERS

Soccer players are popular in your school. To have an autograph of the players, answer the problem below. Analyze the problem carefully. Answer the questions and show your solution on the space provided.

George asked a random sample of 50 athletes in his university regarding their preferences of the color of athletic shoes they wear during competition. There are 300 athletes in George's university. Below is the gathered data.

white	black	blue	red
15	20	9	6

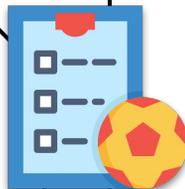
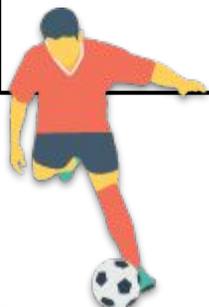


Give 3 inferences:

1.)

2.)

3.)



BEACH VOLLEYBALL

Beach volleyball match is the most awaited event in your school. To watch the game, read and analyze the problem carefully. Answer the questions and show your solution on the space provided.

Coach Jerry plans to order t-shirts for the athletes. He wants to know how many athletes would likely choose black, white and blue t-shirt. He randomly asked 25 athletes. There are 150 athletes in total.

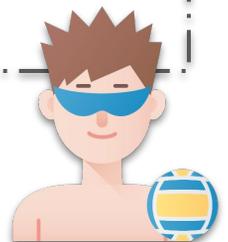
Black	White	Blue
15	8	2



1.) What is the most reasonable estimate for the number of athletes who prefer color black t-shirt?

2.) What is the most reasonable estimate for the number of athletes who prefer color blue t-shirt?

3.) What is the most reasonable estimate for the number of athletes who prefer color white t-shirt?



BASEBALL STADIUM

Your friends' baseball match will be happening in a few days. To get a ticket to enter the stadium, read and analyze the problem carefully. Answer the questions and show your solution on the space provided.

1.) Given:

population: 500 athletes

Sample: 20 athletes

- 12 out of 20 will attend the training.

The estimated number of athletes who will likely to attend the training is ____.

2.) Given:

population: 188 volleyball players

Sample: 34 volleyball players

- 17 out of 34 will wear white shoes in the competition.

The estimated number of athletes who will likely to wear white shoes is ____.

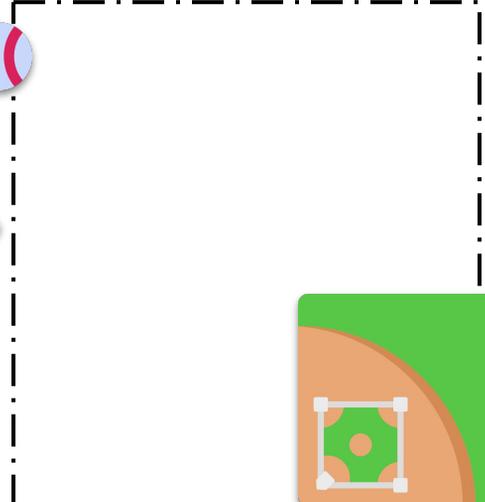
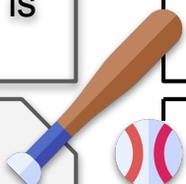
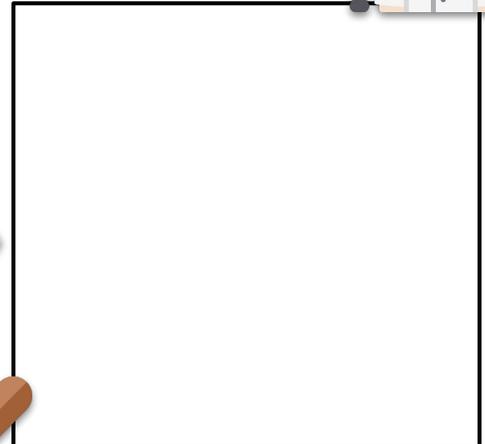
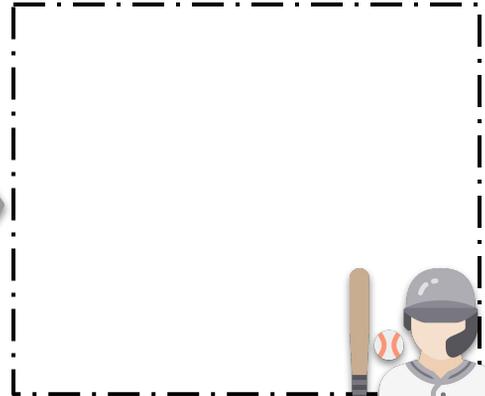
3.) Given:

population: 60 badminton teams

sample: 12 badminton teams

- 7 out of 12 will attend the awarding ceremony.

The estimated number of badminton teams who will likely to attend the awarding ceremony is ____.



ARCHERS AIM FOR GOLD

Let's cheer the archers as they aim for gold. To cheer them up, read and analyze the problem below carefully. Answer the questions and show your solution on the space provided.

Coach Greg asked the volleyball players what snack they prefer. A sample of 30 players were asked. There are 120 volleyball players.

Spaghetti	Carbonara	Lasagna
12	8	10

1.) Using ratio and proportion, what is the most reasonable estimate for the number of players who prefer spaghetti?

2.) Using ratio and proportion, what is the most reasonable estimate for the number of players who prefer lasagna?

3.) Using percentage, what is the most reasonable estimate for the number of players who prefer spaghetti?

4.) Using percentage, what is the most reasonable estimate for the number of players who prefer lasagna?

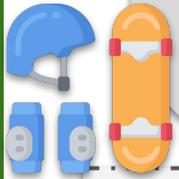


BROKEN SKATEBOARD

Oh no! Jerry's skateboard was broken. Can you let him borrow yours? Read the situation below and analyze it carefully. Answer the questions and show your solution on the space provided.

A group of randomly selected members of HWM sports club were asked how many siblings they have. There are 160 members in HWM sports club. The table shows the results of the survey.

Number of members	8	2	10	12
Number of siblings	5	4	2	3



1.) What is the most reasonable estimate for the number of athletes in HWM sports club who have 5 siblings?

2.) What is the most reasonable estimate for the number of athletes in HWM sports club who have 2 siblings?

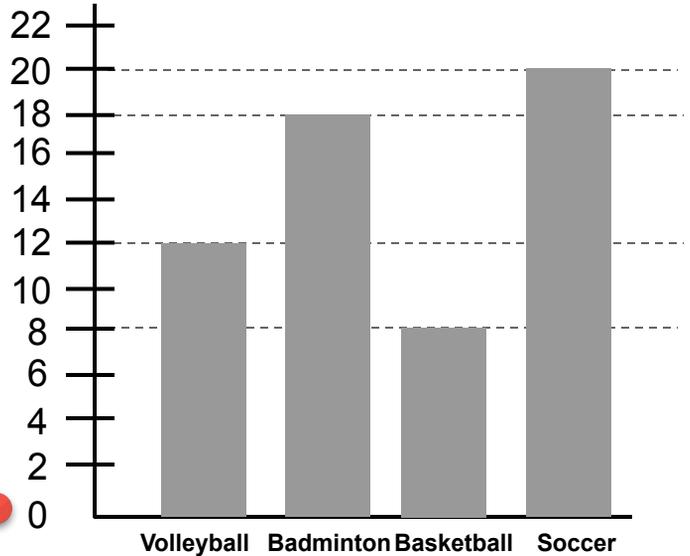
3.) What is the most reasonable estimate for the number of athletes in HWM sports club who have 3 siblings?



ALL ABOUT BOXING

If you managed to answer this problem, your parents will allow you to learn boxing. Read and analyze the problem carefully. Answer the questions and show your solution on the space provided.

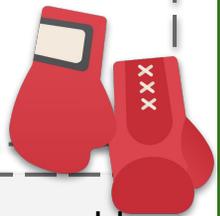
Cynthia surveyed a random sample of 58 athletes in her university. She wants to know what sports they are good at. There are 145 athletes in Cynthia's university. The graph on the side shows the results of the survey.



1.) What is the most reasonable estimate for the number of athletes of Cynthia's University who are good at playing volleyball?

2.) What is the most reasonable estimate for the number of athletes of Cynthia's University who are good at playing basketball?

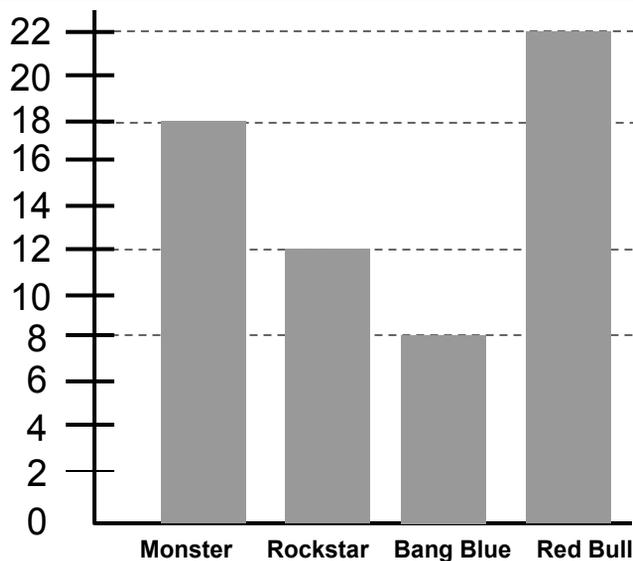
3.) What is the most reasonable estimate for the number of athletes of Cynthia's University who are good at playing badminton?



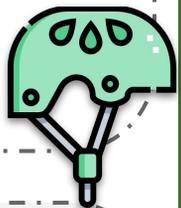
CYCLING SAFETY GEARS

To complete your cycling gears, read the problem below and analyze it carefully. Answer the questions and show your solution on the space provided.

Von surveyed a random sample of 60 athletes in Asia University. He wants to know what energy drink the athletes usually drink. There are 300 athletes in Asia university. The graph below shows the results of the survey.



1.) What is the most reasonable estimate for the number of athletes in Asia University who prefer Red Bull energy drink?



2.) What is the most reasonable estimate for the number of athletes in Asia University who prefer Monster energy drink?

3.) What is the most reasonable estimate for the number of athletes in Asia University who prefer Rockstar energy drink?

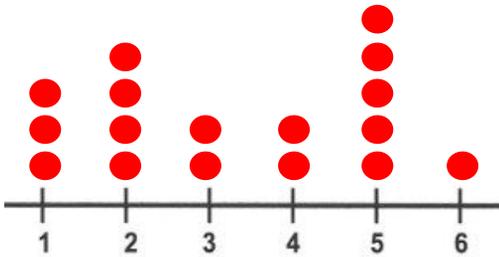


Drawing Inferences About A Population With An Unknown Characteristic



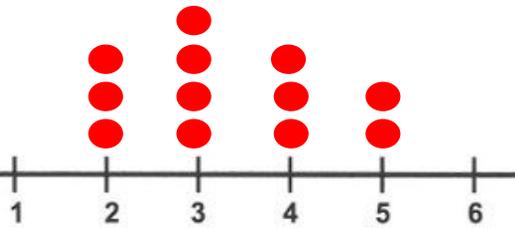
ANSWER GUIDE

Activity 1



1.) Most of them have known at least 1 sport.

2.) Most of them have known fewer than 6 sports.



3.) Most of them drink between 2 to 5 bottle of energy drink a day.

4.) There are more athletes who drink 3 bottles a day than the athletes who drink 2 bottles a day.

Activity 2

1.)

$$\frac{12}{50} = \frac{x}{350}$$

$$x = \frac{12(350)}{50}$$

$$x = 84 \text{ athletes}$$

2.)

$$\frac{16}{45} = \frac{x}{360}$$

$$x = \frac{16(360)}{45}$$

$$x = 128 \text{ athletes}$$

Activity 3

$$1.) \frac{24}{75} = \frac{x}{250}$$

$$x = \frac{24(250)}{75}$$

$$x = 80 \text{ students}$$

$$2.) \frac{15}{75} = \frac{x}{250}$$

$$x = \frac{15(250)}{75}$$

$$x = 50 \text{ students}$$

$$3.) \frac{15}{75} = \frac{x}{250}$$

$$x = \frac{15(250)}{75}$$

$$x = 50 \text{ students}$$



ANSWER GUIDE

Activity 4

$$1.) \frac{15}{50} = \frac{x}{300}$$

$$x = \frac{15(300)}{50}$$

x = 90 athletes

There are 90 athletes who would likely to choose color white shoes.

$$2.) \frac{20}{50} = \frac{x}{300}$$

$$x = \frac{20(300)}{50}$$

x = 120 athletes

There are 120 athletes who would likely to choose color black shoes.

$$3.) \frac{9}{50} = \frac{x}{300}$$

$$x = \frac{9(300)}{50}$$

x = 54 athletes

There are 54 athletes who would likely to choose color blue shoes.

Activity 5

$$1.) \frac{15}{25} = \frac{x}{150}$$

$$x = \frac{15(150)}{25}$$

x = 90 athletes

The estimated number of athletes who prefer black t-shirt is 90.

$$2.) \frac{8}{25} = \frac{x}{150}$$

$$x = \frac{8(150)}{25}$$

x = 48 athletes

The estimated number of athletes who prefer black t-shirt is 48.

$$3.) \frac{2}{25} = \frac{x}{150}$$

$$x = \frac{2(150)}{25}$$

x = 12 athletes

The estimated number of athletes who prefer black t-shirt is 12.



ANSWER GUIDE

Activity 6

$$1.) \frac{12}{20} = \frac{x}{500}$$

$$x = \frac{15(500)}{20}$$

x = 300 athletes

$$2.) \frac{17}{34} = \frac{x}{188}$$

$$x = \frac{17(188)}{34}$$

x = 94 athletes

$$2.) \frac{7}{12} = \frac{x}{60}$$

$$x = \frac{7(60)}{12}$$

x = 35 badminton teams

Activity 7

$$1.) \frac{12}{30} = \frac{x}{120}$$

$$x = \frac{12(120)}{30}$$

x = 48 players

$$2.) \frac{10}{30} = \frac{x}{120}$$

$$x = \frac{10(120)}{30}$$

x = 40 players

$$3.) \frac{12}{30} \times 100\% = 40\%$$

$$0.4 \times 120 = 48 \text{ players}$$

$$4.) \frac{10}{30} \times 100\% = 33.33\%$$

$$0.3333 \times 120 = 48 \text{ players}$$

Activity 8

$$1.) \frac{8}{32} = \frac{x}{170}$$

$$x = \frac{8(170)}{32}$$

x = 40 athletes

$$2.) \frac{10}{32} = \frac{x}{160}$$

$$x = \frac{10(160)}{32}$$

x = 50 athletes

$$3.) \frac{12}{32} = \frac{x}{160}$$

$$x = \frac{12(160)}{32}$$

x = 60 athletes



ANSWER GUIDE

Activity 9

$$1.) \frac{12}{58} = \frac{x}{145}$$

$$x = \frac{12(145)}{58}$$

x = 30 athletes

$$2.) \frac{8}{58} = \frac{x}{145}$$

$$x = \frac{8(145)}{58}$$

x = 20 athletes

$$3.) \frac{18}{58} = \frac{x}{145}$$

$$x = \frac{18(145)}{58}$$

x = 45 athletes

Activity 10

$$1.) \frac{22}{60} = \frac{x}{300}$$

$$x = \frac{22(300)}{60}$$

x = 110 athletes

$$2.) \frac{18}{60} = \frac{x}{300}$$

$$x = \frac{18(300)}{60}$$

x = 90 athletes

$$3.) \frac{12}{60} = \frac{x}{300}$$

$$x = \frac{12(300)}{60}$$

x = 60 athletes



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