

Week 0 Assignments

① 'Statistics and Probability' is the title of a book. If each letter was carved into a block and dropped into a bag, what are the chances a person would draw either the letters A or I from the bag? $\rightarrow \frac{7}{24}$

Explanation

① Count total letters (ignore spaces)

② Count A and I

24

3, 4

③ formula of Probability

$$P = \frac{\text{favourable outcome}}{\text{total outcome}}$$
$$= \frac{3+4}{24} = \frac{7}{24}$$

② A manufacturing company is set up in two different locations. If the number of employees in one location are 663, and the average monthly salary for their employees is \$13454 and the numbers of employees in others

Location are 504, and the average monthly salary for their employees is \$ 17591. Find the combined arithmetic mean of the monthly salary. $\rightarrow \$ 15240.67$

Explanation

i) Location 1 \rightarrow emp: 663, Avg sal: 13454

ii) Location 2 \rightarrow emp: 504, Avg sal: 17591

iii) Formula of Combined Mean $\rightarrow \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$

$$= \frac{(663 \times 13454) + (504 \times 17591)}{663 + 504}$$

$$= \frac{17797,129}{1167} \approx 15240.67$$

- 3 Given 2 Sample 1 = [13.3, 2.4, 10, 13.3, 11]
and sample 2 = [8.5, 7.1, 12.6, 11.5, 10.3].
find the sample which has a relatively greater spread of values from the mean,

Explanation

\rightarrow Sample 1

Spread = variability from mean.

i) Sample 1 has 2.4 (very low), 13.3 (high)

ii) Sample 2 values are closer together.

Bigger deviation from mean = bigger spread

So, Sample 1 is more spread out.

④ Given below is tabular data on a test conducted recently to detect a new mutant of the coronavirus.

	Positive	negative
infected	54	138
not infected	173	111

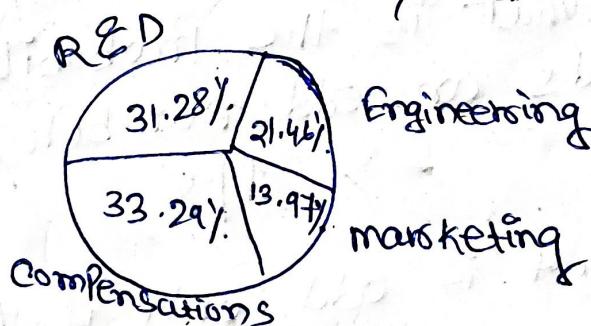
Find the no. of people who have not actually contracted the virus yet have been tested positive? $\rightarrow 173$

Explanation

false Positive = not infected but positive.

⑤ Given a pie chart that indicates the expenditure of a manufacturing organization towards various activities, what is the ratio of expenditure for the R&D department to the marketing department? $\rightarrow 1 : 0.44$

Explanation



$$\textcircled{i} \quad \text{R&D} = 31.28\%$$

$$\text{Marketing} = 13.97\%$$

$$\textcircled{ii} \quad \text{Ratio} = 31.28 : 13.97 - \text{convert to } 1:x$$

$$= 1 : \frac{13.97}{31.28} \approx 1 : 0.44$$

6 Ben is the customer relation manager at a hotel. Recently, Ben has been receiving customers feedback saying that the customers had to wait too long to be served by a customer service representative. Ben decides to note down the customer's waiting time in minutes. What kind of graph would be appropriate to check the frequency distributions of customers' waiting time? \rightarrow Histogram

Explanation

Waiting time \rightarrow continuous data
it needs histogram will frequency distribution, so be the answer.

7 3 natural numbers are chosen at random. What is the probability that their product yields an odd number?

Explanation

$$\rightarrow 1/8$$

Product is odd only if all numbers are odd.

i) Probability of odd = $1/2$

ii) $(\frac{1}{2})^3 = \frac{1}{8} / 1/8$

8 The mean of the first n natural numbers is $\rightarrow (n+1)/2$

Explanation

i) natural no = $1, 2, 3, \dots, n$

ii) mean : $\frac{1+n}{2} = \frac{n+1}{2} = (n+1)/2$

9) 128 Players are participating in a knockout tournament. How many games are required to decide the winners?

Note: In a knockout tournament, whenever two people play, the loser is eliminated and the winner advances to the next round.

Explanation

$$\rightarrow \text{to get 1 winner, it requires } 128 - 1 = 127$$

10) Given $[x_1, x_2, x_3, \dots, x_n]$ are the possible values of a random variable x and $P_1, P_2, P_3, \dots, P_n$ be the corresponding probabilities to each value of the random variable. The mean is computed by the formula

$$\rightarrow \sum_{i=1}^n P_i x_i$$

This is the formula of mean of a discrete random variable.