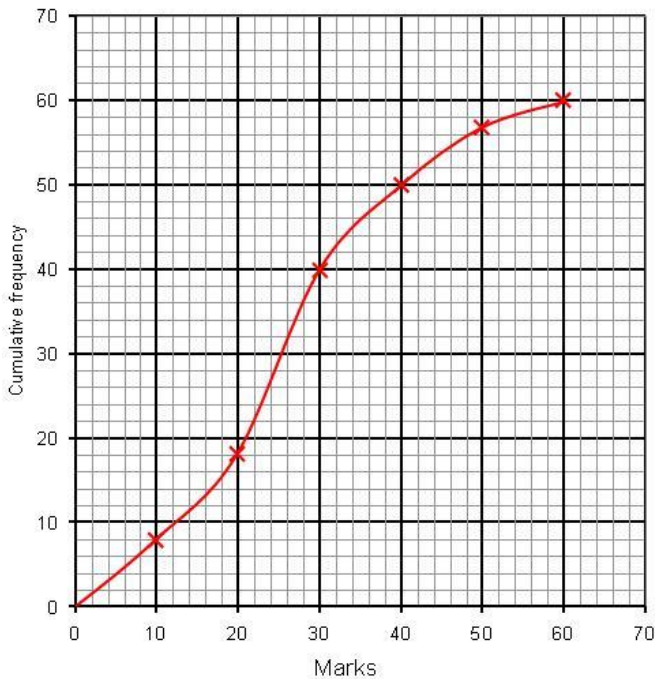


NO CALCULATORS ON THIS SECTION.

[1] Consider the cumulative frequency graph for the marks given on an exam.



[a] How many students took the exam?

[b] How many scored less than 30 points?

[c] Estimate the median score.

[d] Estimate the lower and upper quartiles.

$$Q1 = \underline{\hspace{2cm}} \quad Q3 = \underline{\hspace{2cm}}$$

[e] How many students had a score in the interval $40 \leq x < 60$?

[2] There are 3 red, 3 white, and 4 blue marbles in a bag. A first marble is drawn and not replaced. Then a second marble is drawn. Draw a tree diagram to illustrate this experiment.

[a] Find the probability that the second marble is red.

[b] Find the probability that the marbles are the same color given that the second marble is red.

[3] A and B are independent events. It is known that $P(A) = 0.12$ and $P(B) = 0.20$. Find $P(A \cap B)$.

[5] For events C and D, we know that $P(C) = 0.25$, $P(D) = 0.4$, and $P(C \cup D) = 0.5$.

[a] Determine if C and D are independent events.

[b] Find $P(C \cap D)$

[4] Consider the data set: **1, 2, 4, 5, 7, 8, 9, 11, 13, 14, 16, 20**. Determine the interquartile range.

[5] When Bob and Cindy go on a date, she picks the restaurant $\frac{1}{4}$ of the time and Bob chooses the rest of the

time. On $\frac{2}{3}$ of the occasions when Cindy chooses the restaurant, she orders dessert. On $\frac{1}{3}$ of the occasions

when Bob chooses the restaurant, she orders dessert. [a] Draw a probability tree to illustrate this situation

[b] Find the probability that Cindy gets dessert. [c] Find the probability that Bob chose the restaurant if Cindy gets dessert.

[6] The average number of errors per page in a typed manuscript is 3 and the number of errors follows a Poisson distribution.

[a] Write an expression for the probability that a randomly selected page has exactly 1 error.

[b] State the variance of this distribution. _____

[7] A sides of a tetrahedral die are numbered from 1 to 4. Three of these dice are rolled. Let the random variable X be the number of 4's that land face down.

[a] Find $P(X = 0)$. [b] Find $P(X = 1)$. [c] Find $P(X = 2)$. [d] Find $P(X = 3)$.

[e] $E(X) =$ _____ and $\text{Var}(X) =$ _____

[8] A probability density function is given by $f(x) = \begin{cases} x, & 1 \leq x \leq \sqrt{3} \\ 0, & \text{elsewhere} \end{cases}$.

[a] Set up and evaluate an integral expression to verify that the median of this distribution is $\sqrt{2}$.

[b] Set up and evaluate an integral expression to evaluate $P(1 \leq X \leq 1.5)$

[9] The scores on a certain test are normally distributed with a mean of 500 points and a standard deviation of 100 points. 100 students take this test. To the nearest whole number, how many of these 100 students score between 400 and 600 on the test?

[10] The random variable X has a probability distribution given by the following table.

x	1	2	3	4	5
$P(X=x)$	a	$2a^2$	$2a^2$	a^2	a^2

Find the value of a .

CALCULATOR SECTION

[1] Consider the table of grouped data shown here for a set of measurements.

Lengths (cm)	frequency
$0 \leq x < 4$	3
$4 \leq x < 8$	6
$8 \leq x < 12$	12
$12 \leq x < 16$	14
$16 \leq x < 20$	8
$20 \leq x < 24$	6

[a] Estimate the mean of the data. _____

[b] Estimate the standard deviation of the data. _____

[c] Name the modal class: _____

[2] In a certain IB program, 40% of the students are boys. 60% of the boys and 30% of the girls take HL Math.

Find the probability that a randomly selected student is a girl given that the student takes HL Math.

[3] At the Birdsong Carwash, an average of 15 cars show up each hour. The number of cars follows a Poisson Distribution. Let X be the number of cars that come in during a three hour stretch.

[a] Find $P(X = 15)$.

[b] Find $P(X > 16)$.

[4] The wingspan of the Arnott sparrow follows a normal distribution with a mean of 40cm and a variance of 9cm. Let X be the wingspan of a randomly selected sparrow.

[a] Find $P(36 \leq X \leq 41)$.

[b] Find $P(X \geq 26)$.

[c] 10% of Arnott's have a wingspan of more than p cm in length. Find p .

[5] A biased coin lands heads up $\frac{2}{5}$ of the time. 6 of these biased coins are tossed. Let X be the number of heads that show.

[a] Find $P(X = 1)$.

[b] Find $P(X \geq 1)$.

[6] A probability density function for the random variable X is given by $f(x) = \begin{cases} \frac{3}{4}(1-(x-1)^2), & 0 \leq x \leq 2 \\ 0, & \text{elsewhere} \end{cases}$.

[a] Find $E(X)$. You must show the definite integral. $E(X)$

[b] Find $\text{Var}(X)$. Show your reasoning.

[c] Find the median of X .

ALSO, see items 1, 3, & 7a on the vectors practice test