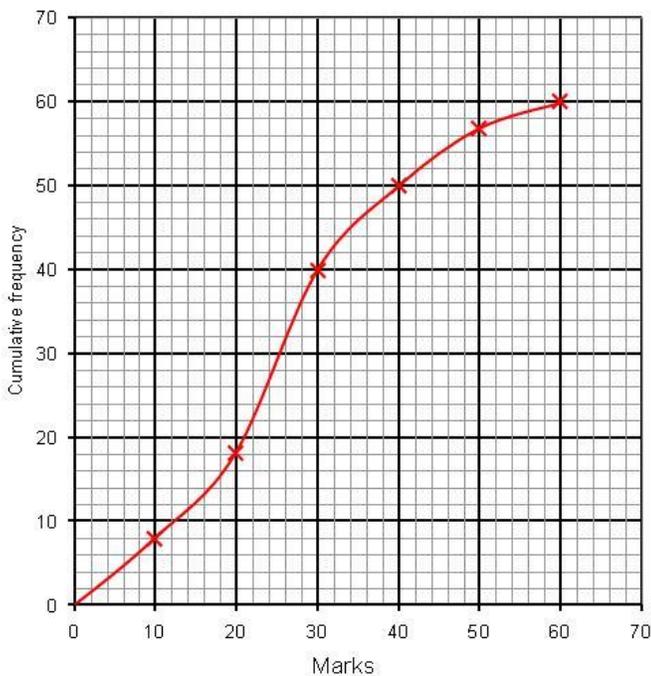


[1] Consider the cumulative frequency graph for the marks given on an exam.



- [a] How many students took the exam?
- [b] How many scored less than 30 points?
- [c] Estimate the median score.
- [d] Estimate the lower quartile
- [e] How many students had a score in the interval  $40 \leq x < 60$ ?

[2] There are 6 boys and 4 girls in the math club. Three club members are selected to go to a tournament as a team.

- [a] How many different teams are possible?
- [b] Find the probability that a randomly selected team will have more boys than girls.
- [c] Jack and Jill are math club members. Find the probability that a randomly selected team will NOT have both Jack and Jill as members.

[3] 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.

- [a] Find the probability that the second marble is red.
- [b] Find the probability that the first marble is red given that the second marble was red.

[4] If A and B are independent events. It is known that  $P(A) = 0.12$  and  $P(B) = 0.20$ .

- [a] Find  $P(A|B)$
- [b] Find  $P(B|A)$

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

[6] When Bob and Cindy go on a date, she gets to pick 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. Find the probability that Cindy gets dessert.

[7] 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 there a randomly selected page has exactly 1 error.

[b] State the variance of this distribution. \_\_\_\_\_

[8] 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] Make a probability distribution table for this experiment. [b] Find  $E(X)$  and  $\text{Var}(X)$ .

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

[a] Evaluate  $P(1 \leq X \leq 1.2)$  [b] Find the median of the distribution.

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

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

[11] Given  $\mathbf{u} = \begin{pmatrix} 2 \\ 6 \\ 9 \end{pmatrix}$  and  $\mathbf{v} = \begin{pmatrix} 10 \\ -2 \\ 11 \end{pmatrix}$ . [a] Find  $\mathbf{u} + 3\mathbf{v}$  Find [b] the angle between  $\mathbf{u}$  and  $\mathbf{v}$ . [c] The vector and

Cartesian equations for the plane containing  $\mathbf{u}$  and  $\mathbf{v}$  passing through  $(2,4,-5)$ . [d] The parametric equations for line passing through the point  $(-2, 4, 6)$  parallel to  $\mathbf{v}$ .

### Calculator Section

[12] At the Padula Hair & Nail Salon, an average of 6 walk-in customers show up each hour. The number of customers follows a Poisson Distribution. Let  $X$  be the number of customers who walk in during the two-hour stretch from 1:00 to 3:00 pm. [a] Find  $P(X = 10)$ . [b] Find  $P(X > 12)$ .

[13] The heights of adult males follows a normal distribution with a mean of 68in and a variance of 3in. Let  $X$  be the height of a randomly selected male. [a] Find  $P(65 \leq X \leq 68)$  [b] Find  $P(X \geq 70)$ . [c] 10% of men are more than  $p$  inches tall Find  $p$ .

[14] 12 fair coins are tossed. Let  $X$  be the number of heads that show. [a] Find  $P(X = 8)$ . [b] Find  $P(X \geq 8)$

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

[a] Find  $E(X)$ . [b] Find  $\text{Var}(X)$ . [c] Find  $P(0.25 \leq X \leq 0.75)$  [d] Find the median of  $X$

[16] 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: \_\_\_\_\_

[17] How many arrangements are possible for the letters in the word STATISTICS?

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

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