

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
GEITA ADVENTIST SECONDARY SCHOOL
FORM FOUR HOLLIDAY PACKAGE 27TH APRIL 2020
MATHEMATICS

1. (a) Two numbers are chosen at random from 1, 2 and 3. What is the probability that their sum is odd?

(b) If A and B are two events such that $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{12}$, find

(i) $P(A \cup B)$ (ii) $P(\bar{A} \cap \bar{B})$
2. (a) A fair dice is tossed once and the number showing up is recorded. What is the probability of an even number greater than two showing up?

(b) At a second-hand car show room, 20% of the cars have no engine, 40% have bad tires and 15% have no engine and have bad tires. What is the probability that a car chosen at random has good tires and an engine?
3. (a) Find the probability that a number chosen at random from a set of integers between 10 and 20 inclusive is either a prime number or a multiple of five.

(b) A box contains 4 white balls and 5 black balls. Two balls are drawn at random from the box. Find the probability that both balls drawn are

(i) White (ii) Black
4. (a) A fair die and coin are tossed together. What is the probability of a head on the coin and an even number of the die showing up?

(b) Three defective transistors and two good transistors are mixed in a box. Two transistors are randomly selected. Find the probability that they are both defective if the selections are made: (i) With replacement (ii) Without replacement
5. (a) A box has 8 red balls and 11 white balls of the same size. A ball is drawn at random from the box. What is the probability that it is

- (i) Red (ii) White
- (b) A two digit number is written using the numbers 2, 3 and 4 without repetition. Find the probability that the number is: (i) Even (ii) Less than 30
6. Moses and Mtila are about to sit for the interview of teaching post. Moses says ‘‘ I have a 50% chance of passing my interview’’. Mtila says ‘‘ Probability of failing my interview is $\frac{2}{3}$ ’. Find the probability that:
- (i) Mr Mtila will pass an interview.
- (iv) Either Moses will win interview or Mtila will fail interview.
7. (a) A pair of dice is thrown. Find the probability that the sum is 10 or greater if a 5 appear on the die.
- (b) Given that $P(A) = \frac{1}{6}$, $P(B) = \frac{1}{6}$ and $P(A \cap B) = \frac{1}{12}$ Find $P(A \cup B)$
8. (a) Given that $f(x) = \begin{cases} x^2 & \text{if } x < 0 \\ x+1 & \text{if } x \geq 0 \end{cases}$
- (i) Draw the graph of $f(x)$
- (ii) State the domain and range of $f(x)$
- (iii) Find $f(-1)$ and $f(1)$
- (b) The number 1 to 20 are each written on a card, the 20 cards are then mixed together. One card is chosen at random from the pack. Find the probability that the number on the card is:
- (i) Even (ii) A factor of 24 (iii) Prime
9. (a) If the probability that Sabri will pass Mathematics is 0.3 and the probability that he will pass biology is 0.6, find the probability that:
- (i) He will pass both subjects. (ii) He will fail both subjects.
- (b) If A is the event ‘‘ Sabri will pass Mathematics’’ and B is the event ‘‘ Sabri will pass biology’’ show whether or not A and B are independent events
10. The probability that Faheem and Fahima will be selected for A-level studies after completing O-level studies is 0.4 and 0.7 respectively. Calculate the probability that:
- (i) Both of them will be selected (ii) Either Faheem or Fahima will be selected.

11. (a) A die and a coin are tossed together. What is the probability of getting a tail and a number at least greater than 3.
- (b) A bag has 4 defective bulbs and 5 non-defective bulbs. Two bulbs are taken from the bag one after another without replacement. Find the probability that
- (i) Both are defective bulbs
 - (ii) The first is defective the second is non-defective
 - (iii) The first is non-defective and the second is defective.
12. (a) Cards are numbered 1 to 30. A card is taken at random. Find the probability that it is neither a multiple of 3 nor a multiple of 5.
- (b) A box contains 7 red balls and 14 black balls. Two balls are drawn at random without replacement
- (i) Draw a tree diagram to show the results of drawings.
 - (ii) Find the probability that both are black.
 - (iii) Find the probability that they are of the same colour.
 - (iv) Find the probability that the first is black and the second is red.
 - (v) Find the probability that they are of different colours.
13. (a) A die and a coin are tossed together. What is the probability of getting a tail and an even number?
- (b) A bag contains 6 white balls and 3 yellow balls. A ball is selected at random and not replaced. Another ball is then selected. Find the probability of selecting one white ball and one yellow ball.
14. (a) If two dice are rolled, what is the probability of getting a sum of 8.
- (b) A bag contains 3 red balls, 4 white balls and 2 black balls. Find the probability of getting a red ball on the first draw, black ball on the second draw and a white ball on the third draw if:
- (i) The balls are drawn with replacement
 - (ii) The balls are drawn without replacements.

15. (a) A jar contains 3 white balls, 2 red balls and 1 blue ball. If two balls are drawn at random, one after another without replacement, what is the probability that they will all be red?
- (b) An experiment consists of rolling two fair dice.
- (i) List all the possible events of this experiment.
 - (ii) Find the probability that the sum of the numbers on the dice will be at least ten.
 - (iii) Find the probability that both dice will show prime numbers.
16. The probability that a girl is selected for further studies is $\frac{1}{3}$ and that a boy is selected is $\frac{1}{4}$. If I have two children, a boy and a girl, find the probability that:
- (i) Both of them will be selected for further studies.
 - (ii) None of them will be selected for further studies.
17. Two balls are selected at random, one after another without replacement, from a bag containing 4 red balls and 3 green balls. Compute the probability of each of the following events:
- (i) Drawing two red balls
 - (ii) Drawing two green balls
 - (iii) Drawing one red ball and one green ball
18. A box contains 3 black marbles and 2 white marbles. In two successive draws, what is the probability of getting 2 white marbles if:
- (i) The first marble is kept out.
 - (ii) The first marble is replaced before the second draw.
19. A jar contains four marbles: one red, one green, one blue and one white. If two marbles are drawn from this jar, one after another without replacing the one already drawn what is the probability of the following events:
- (i) One marble is red
 - (ii) The first marble is red or blue
 - (iii) The marbles are of the same colour
 - (iv) The first marble is not white

- (v) Neither marble is yellow
20. (a) In a family of 4 children, what is the probability that:
- (i) There is at least one girl?
 - (ii) Both are boys?
- (b) The probability that a pupil passes in a Physics examination is 0.8 and the probability that he will pass in Chemistry examination is 0.6. Find the probability that the pupil will pass in both examination.
21. A bag contains 3 black balls, 4 blue balls and 2 yellow balls.
- (i) What is the probability of drawing a black ball?
 - (ii) How many black balls should be added to the bag so that the probability of drawing a black ball should be –
 - (iii) How many blue balls should be added to the bag so that the probability of drawing a black ball should be
22. (a) Find the probability of at least a single head in a single toss of three coins.
- (b) A jar contains 2 black marbles, 3 blue marbles and 1 white marbles. If one marble is drawn and put aside and then another drawn and put aside, determine:
- (i) The probability that both marbles are black
 - (ii) The number of black marbles should be added to the jar so that the probability of drawing 2 black marbles should be
 - (iii) The number of blue marbles should be removed from the jar so that the probability of drawing 2 black marbles should be –
23. A box contains 4 defective transistors and 12 good transistors. If two transistors are drawn from the box (i) with replacement (ii) without replacement, what is the probability that:
- (i) The first is good and the second is defective
 - (ii) The first is defective and the second is good
 - (iii) One of the transistors drawn is good and the other is defective.

25. (a) Mr Moses has two shirts; a white one and a blue one. He also has three trousers, a green one, a black one and a yellow one. What is the probability of
- (b) Two numbers are to be selected from 1, 2, 3. If repetition is not allowed, find the probability that their sum is even or prime.
- (c) If a number is to be chosen at random from integers Find the probability that: (i) It is an even number (ii) It is divisible by 3
- (d) In part (c) above, if E is the set of even numbers and F is the set of those numbers divisible by 3. Show whether E and F are mutually exclusive events.
26. (a) Given $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$
- (i) Sketch the graph of $f(x)$
- (ii) State the domain and range of $f(x)$
- (iii) Evaluate $f(-1)$ and $f(1)$
- (b) In a family of two children, find the probability that:
- (i) One is a boy.
- (ii) Same sex.
- (iii) At most one girl.
27. (a) A card is chosen from a pack of playing cards. What is the probability of getting
- (i) A red card?
- (ii) Either a club or a jack?
- (iii) A queen of spades?
- (b) A function $f(x)$ is defined as $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$
- (i) Sketch the graph of $f(x)$
- (ii) State the domain and range

28. (a) (iii) Find $f(-2)$, $f(0)$ and $f(4)$
 The function is defined as follows: $() \{$
- Draw its graph then states its domain and range.
- (b) A bag contains 6 red balls and 8 blue balls. If one ball is drawn at random from the bag and then being replaced before the second ball being drawn, find the probability of drawing the balls of
- (i) Different colour (ii) Same colour.

29. (a) The function $()$ is defined by $() \{$
- sketch the graph of $()$
- (b) Given that $()$, find
- (i) Axis of symmetry.
- (ii) Maximum or minimum value.
- (iii) Turning point.
- (c) Consider a group of 36 students suppose that A and B are two properties that each student either has or does not have. The events are

A: Student has blue eyes.

B: Student is a male.

If there are 12 male and 24 female students and half of each sex has blue eyes.

- (i) Find $P(A)$ and $P(B)$
- (ii) Are A and B independent events?
30. (a) Without using a table of value, sketch the graph of $()$ and
- from the graph.
- (i) Allocate the turning point and axis of symmetry.
- (ii) Find the solution of

- (b) Three defective and two good transistors are mixed together in a box. Two transistors are selected at random. Find the probability that they are of the same status if the selections are made:
- (i) With replacement. (ii) Without replacement.
31. (a) If $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$
- (i) Sketch the graph of $f(x)$ (ii) Find the values of $f(-1)$, $f(0)$ and $f(1)$.
- (b) A box contains 9 balls of which 5 are green and 4 are yellow. Two balls are taken at random one after another without replacement. Find the probability that the balls are
- (i) Both green (ii) The first is green the second is yellow
- (iii) One is yellow and one is green
32. (a) Represent the mapping $f: A \rightarrow B$ on an arrow diagram given the domain $A = \{1, 2, 3, 4, 5\}$ and the codomain $B = \{a, b, c, d, e\}$ where $f(1) = a, f(2) = b, f(3) = c, f(4) = d, f(5) = e$.
- (b) Given $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$ sketch the graph of $f(x)$ and determine the domain and range from the graph.
- (c) If an integer is chosen at random from 1 to 40 inclusive, find the probability that it is a prime number or a multiple of 5.
33. (a) six defective bulbs and four good bulbs which are identical are mixed in a box. Two bulbs are random selected. Find the probability that they are both defective if the selections are made.
- (i) With replacement. (ii) With no replacement.
- (b) Given a function $f(x)$ is defined as $f(x) = \begin{cases} x^2 + 1 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$
- (i) Sketch the graph of $f(x)$.
- From the graph, state the domain and range of $f(x)$.
- (ii)

