**FORM 4 MATHS – APRIL 2023 HOLIDAY ASSIGNMENT**

1. The length and width of a rectangle measured to the nearest millimeter are 7.5cm and 5.2cm respectively.

Find, to four significant figures, the percentage error in the area of the rectangle. (3 marks)

1. A bag contains 2 white balls and 3 black balls. A second bag contains 3 white balls and 2 black balls. The balls are identical except for the colors.

Two balls are drawn at random, one after the other from the first bag and placed in the second bag. Calculate the probability that the 2 balls are both white. (2 marks)

1. A particle starts from O and moves in a straight line so that its velocity V ms-1 after time *t* seconds is given by V = 3t – t2. The distance of the particle from O at time *t* seconds is *S* metres.
2. Express *s* in terms of *t* and *c* where *c* is a constant. (1 mark)
3. Calculate the time taken before the particle returns to O. (3 marks)
4. .a) Expand and simplify (2 – x)5 (2 marks)
5. Use the first 4 terms of the expression in part (a) above to find the approximate value of (1.8)5 to 2 decimal places.
6. a) Using line AB given below, construct the locus of a point P such that APB = 900. (1 mark)

A **B**

1. On the same diagram locate **two** possible position of point C such that point C is on the locus of P and is equidistance from A and B. (2 marks)
2. Find the value of *x* give that

Log (15 – 5x) – 1 = log (3x – 2) (3 marks)

1. (a) Complete the table below, giving the value correct to 2 decimal places. (2 marks)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X0 | 00 | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 |
| Cos X0 | 1.00 | 0.94 | 0.77 | 0.50 |  | -0.17 |  | -0.77 |  | -1.00 |
| Sin x0 – Cos x0 | -1.00 | -0.60 |  | 0.37 | 0.81 |  | 1.37 |  | 1.28 | 1.00 |

1. On a grid and using the same axes draw the graphs of y = Cos x0 and y = sin x0 – Cos x0 for 00 ≤ x ≤ 1800 .Using the scale; 1 cm for 200 on the x-axis and 4cm for 1 unit on the y-axis (5 marks)
2. Using the graph in part (b);
3. Solve the equation sin x0 – cos x0 = 1.2; (1 mark)
4. Solve the equation cos x0 = ½ sin x0; (1 mark)
5. Determine the value of cos x0 in part (c) (ii) above. (1 mark)
6. In the figure below OJKL is a parallelogram in which OJ = 3p and OL = 2r

 L K

 2**r**

 O 3**p** J

1. If A is a point on LK such that LA = ½ AK and point B divide the line JK externally in the ratio 3:1, express **OB** and **AJ** in terms of **p** and **r.** (2 marks)
2. Line OB interests AJ at X such that **OX** = m**OB** and **AX** = n**AJ.**
3. Express OX in terms of p, r and m. (1 mark)
4. Express OX in terms of p, r and n (1 mark)
5. Determine the value of *m* and *n* and hence the ratio in which point x divides line AJ. (6 marks)
6. The position of three points A, B and C are (340N, 160W) , (340N, 240E) and (260S, 160W) respectively.
7. Find the distance in nautical miles between:
8. Port A and B to the nearest nautical miles; (3 marks)
9. Ports A and C. (2 marks)
10. A ship left port A on Monday at 1330h and sailed to Port B at 40 knots.

Calculate:

1. The local time at port B when the ship left port A; (2 marks)
2. The day and the time the ship arrived at port B (3 marks)
3. A carpenter takes 4 hours to make a stool and 6 hours to make chair. It takes the carpenter and at least 144 hours to make x stools and y chairs. The labour cost should not exceed Ksh.4800. the carpenter must make a least 16 stools and more than 10 chairs.
4. Write down inequalities to represent the above information. (3 marks)
5. Draw the inequality in (a) above on a grid. (4 marks)
6. The carpenter makes a profit of Ksh 40 on a stool and Ksh 100 on a chair. Use the graph to determine the maximum profit the carpenter can make. (3 marks)
7. The first term of an Arithmetic Progression (A.P.) with six terms is p and its common difference is c. Another A.P. with five terms has also its first term as p and a common difference of d. the last terms of the two Arithmetic Progressions are equal.
8. Express d in terms of c. (3 marks)
9. Given that the 4th term of the second A.P. exceeds the 4th term of the first one by 1 ½ , find the value of c and d. (3 marks)
10. Calculate the value of p if the sum of the terms of the first A.P. is 10 more than the terms of the second A.P. (4 marks)
11. In a uniform accelerated motion the distance
12. Express in terms of (3 marks)
13. Find:
14. The distance travelled in 5 seconds; (2 marks)
15. The time taken to travel a distance of 560 metres. (3 marks)