

NAME:

INDEX NO:

SCHOOL:

DATE:

SIGN:

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST - 2018
TIME: 2 ½ HOURS

06

FOCUS A365 PREDICTION REVISION KITS - 2018

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided at the top of this page.
2. This paper consists of two sections: **Section I and Section II**
3. Answer all questions in section I and any five questions from **Section II**.
4. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
5. Marks may be given for correct working even if the answer is wrong.
6. Non- programmable silent electronic calculators **and KNEC** Mathematical tables may be used..

FOR EXAMINER'S USE ONLY

SECTION I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

--

This paper consists of 16 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION 1

1. Evaluate without using tables or calculator. (3mrks)

$$\frac{2.5 \times \sqrt{18}}{3 \times \sqrt{12.8}}$$

2. Given that $6 \leq x \leq 13$ and $2 \leq y \leq 5$. Find the range within which $\frac{x + y}{x - y}$ lies (3mrks)

3. (a) Find the standard deviation for the set of numbers 2, 5, 6, 7, 3, 8, 9, 8, (3mrks)

- (b) Suppose a constant term 5 is added to every number. Find the new standard deviation give a reason for your answer. (1mrk)

4. A point **P** divides the line **RT** in the ratio -2:5. Find the coordinates of **P** given **R**(3,1) and **T**(6,-5) (3mrks)

5. Expand $(1 + 2x)^7$ upto the term in x^3 . Use your expansion to estimate $(1.02)^7$ to 4dp.(3mrks)

6. Three business partners Denga, Nyamita and cobe agreed to share shs. 1800 gained after a sale of property. For every shs. 1 that Denga gets, Nyamita gets 50cts and for every shs 2 that Nyamita's gets cobe gets shs. 3. Find Nyamita's share. (3mrks)

7. The probability of a couple getting a baby girl is 0.55 and that of a baby boy is 0.45. The couple intend to have two children. Find the probability that they will be of different sexes. (3mrks)

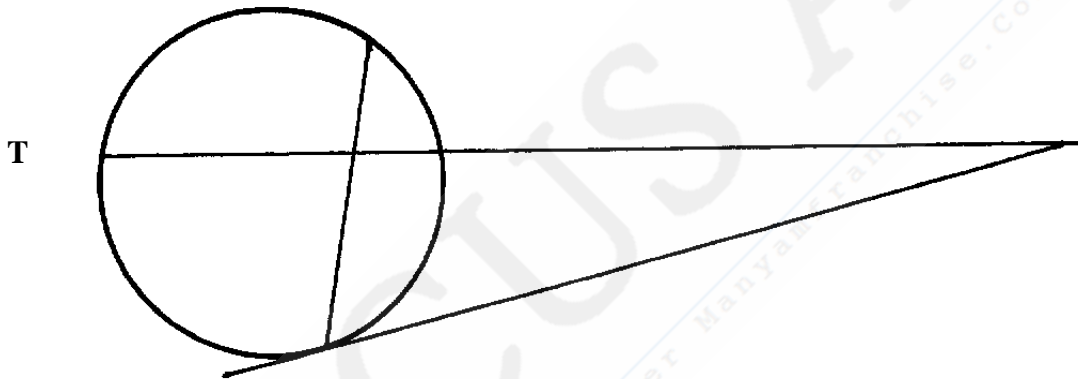
- 8 Use logarithm table to evaluate. (4mrks)

$$\left(\frac{6.79 \times 0.3911}{\log 5} \right)^{3/4}$$

9. In what ratio will coffee grade **A** costing kshs. 90 per kg be mixed with grade **B** costing kshs.60 per kg so that a profit of 25% is realized by selling the mixture at kshs.80 per kg. (3mrks)

10. h varies directly as v and inversely as the square of r . Find the percentage change in h if v is increased by 20% and at the same time r is increased by 50%. (3mrks)

11. In the figure below, BT is a tangent to the circle at B . $AXCT$ and BXD are straight lines. $AX = 6\text{cm}$, $CT = 8\text{cm}$, $BX = 4.8\text{cm}$ and $XD = 5\text{cm}$.



Find the length of BT .

(2mrks)

12. Solve the simultaneous equations (3mrks)
- $$\begin{aligned} \text{Log } (x - 1) + 2 \log y &= 2 \log 3 \\ \text{Log } x + \log y &= \log 6 \end{aligned}$$

13. Given that the area of an image is four times the area of the object under a transformation whose matrix is

$$\begin{pmatrix} x & x - 4 \\ x + 8 & x \end{pmatrix}$$

Find the value of x . (3mrks)

14. Find the amplitude period and phase angle of $y = -\frac{5}{7} \cos\left(\frac{3x}{4} - 25^\circ\right)$ without sketching the graph. (3mrks)

15. Two planes **P** and **Q** are at (**36°N 125° W**) and (**36°N 55°E**) respectively. Calculate the distance in nautical mile between **P** and **Q** measured along the circle through the North Pole. (3mrks)

- 16 Draw a line **AB** 6cm. **P** is a variable point in the plane of the paper above **AB** such that $\angle APB = 60^\circ$ and the area of the triangle **APB** = **12.5cm²**. By accurate construction locate the locus of **P**. (4mrks)

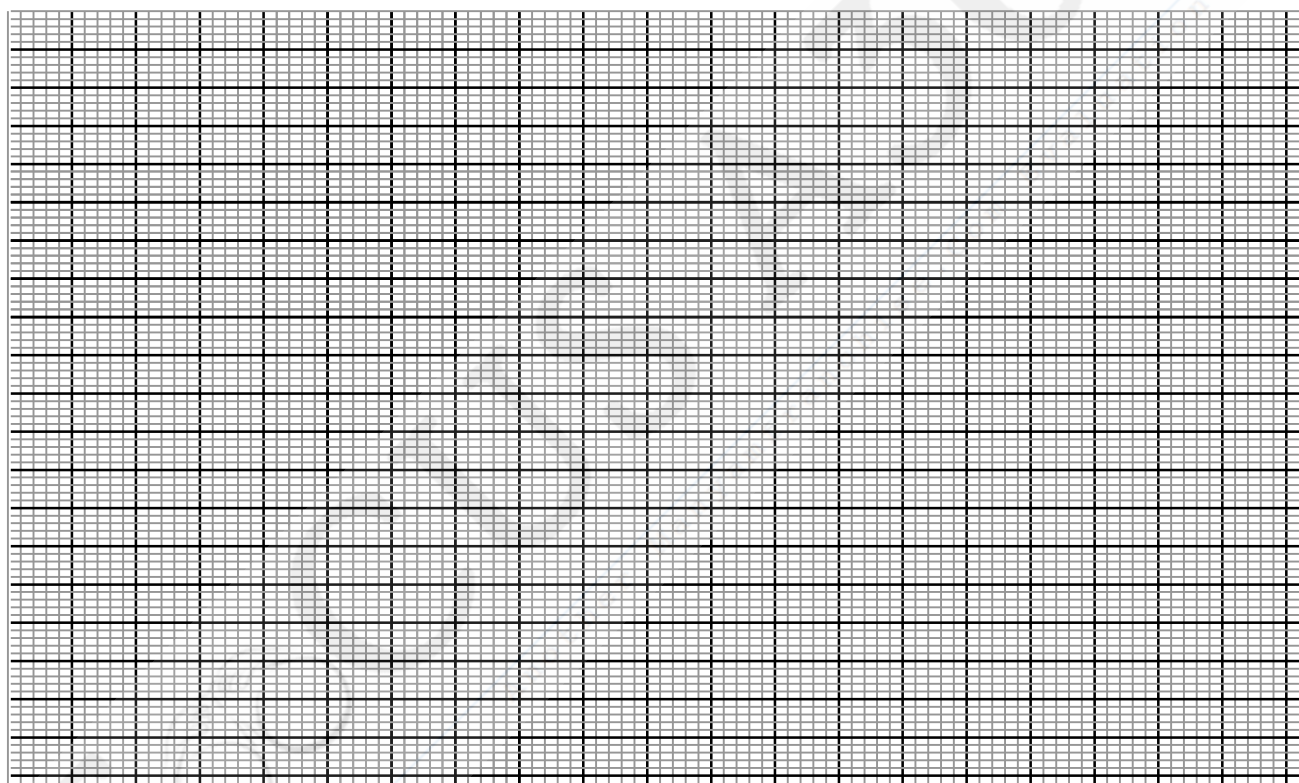
SECTION 11

Attempt any five questions from this section

17. Complete the table by filling the black spaces. (2mrks)

X°	0	3	6	9	120	150	180	210	240	270	300	330	360
		0	0	0									
$\cos x$	1.00						-1.0						1.00
$2 \cos \frac{1}{2} x^{\circ}$	2.00						0.0						- 2.00

(a) Using the scale 1cm to represent 30° on the horizontal axis 4cm to represent 1 unit on the vertical axis draw, on the grid provided, the graphs $y = \cos x$ and $y = 2 \cos \frac{1}{2} x^{\circ}$ on the same axis. (4mrks)



(b) Find the period and the amplitude of $y = 2 \cos \frac{1}{2} x^{\circ}$ (2mrks)

(c) Describe the transformation that maps the graph of $y = \cos x$ on the graph of $y = 2 \cos \frac{1}{2} x^{\circ}$ (1mrk)

(d) State the value of x for which (1mrk)

$$\cos x - 2\cos \frac{1}{2} x = 0$$

 FOCUS A365

Another ManyanFranchise.Com Evaluation Test

18. The product of the first three terms of a geometric progression is 64. If the first term is a and the common ratio is r .

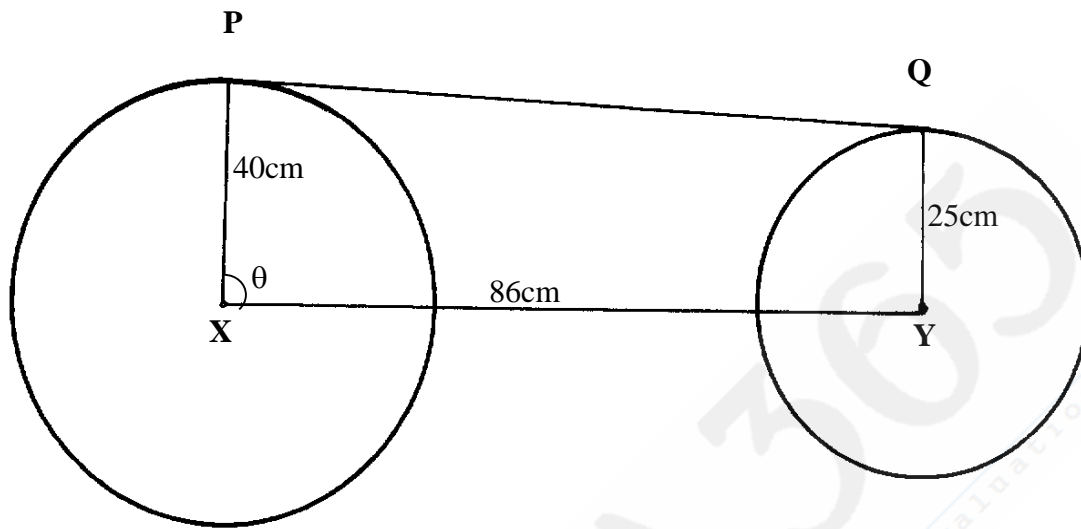
(a) Express r in terms of a . (3mrks)

(b) Given that the sum of the three terms is 14; Find the values of a and r and hence write down two possible sequences each up to the 4th term. (5mrks)

(c) Find the product of the 50th terms of the two Sequences. (2mrks)

19. The figure below shows a direct –belt drive system consisting of two pulleys of radii 40cm and 25cm. The centres of the pulleys x and y are 86cm apart. Calculate the total length of the belt to 4 s.f.

(10mrks)



FOCUS A300
Another ManyanFranchise .Com Evaluation Test

20. Water is flowing through a cylindrical pipe at the speed of 1.2m/s. If the pipe has an internal radius of 1.4cm, Calculate
- (a) The volume of water delivered by the pipe per second in cm^3 (Take $\pi = 22/7$)
(2mrks)
- (b) The depth to which the pipe fills a rectangular tank of base dimensions 1.5m x 2m in one hour to the nearest 0.1cm.
(3mrks)
- (c) The time taken, to the nearest second for the pipe to fill a 50 litre bath tub (initially empty) which has a hole at the base that drains the tub at the rate of 3 litres per minute.
(5mrks)

21. The table below gives some of the values of x and y for the function $y = \frac{1}{2}x^2 + 2x + 1$ for $0 \leq x \leq 6$

x	0	1	2	3	4	5	6
y	1	3.5	7	11.5	17	23.5	31

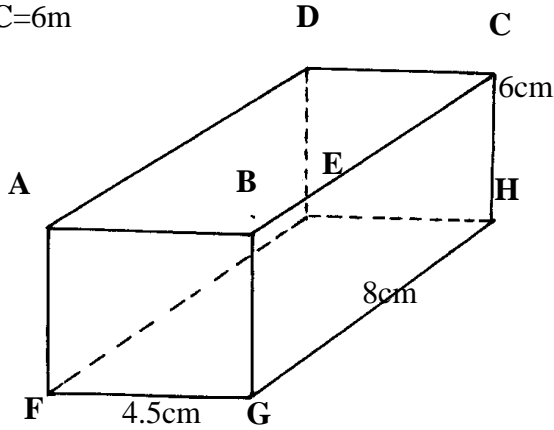
- a) Use the values in the table above to draw the graph of $y = \frac{1}{2}x^2 + 2x + 1$ (2mrks)

- (b) Using Trapezoidal rule, estimate the area bound by the curve x axis, y axis and the line $x = 6$ using 6 trapezia. (3mrks)

- (c) Use the mid – ordinate rule with 6 strips to estimate the area bound by the curve, x axis and $x = 6$. (3mrks)

- (d) If the exact area of the region described above is 78cm^2 , Calculate the percentage error made when mid ordinate rule is used. Give your answer to two d.p. (2mrks)

22. The diagram below represents a Cuboid **ABCDEFGH** in which **FG** =4.5cm, **GH** =8cm
HC=6m



- (a) Calculate the length **FC** (2mrks)
- (b) (i) The size of the angle between the lines **FC** and **FH** (2mrks)
- (ii) Size of the angle between the line **AB** and **FH**. (2mrks)
- (c) The size of the angle between the planes **ABHE** and the plane **FGHE**. (2mrks)
- (d) The total surface area of the cuboid (closed) (2mrks)

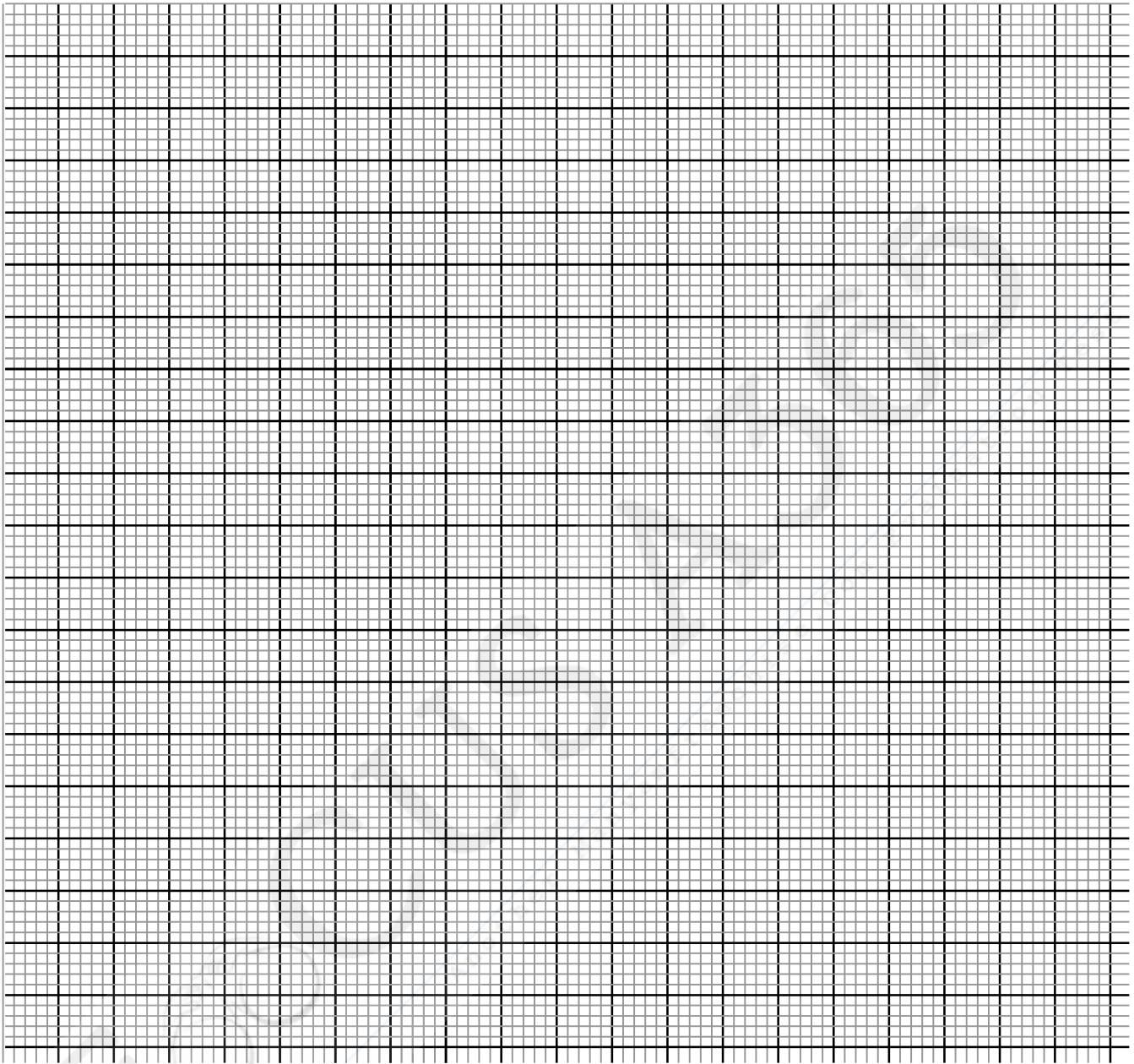
23 Mr. Olik a drapper in Muhoroni town is required to supply two types of shirts, type **A** and type **B** to Muhoroni Secondary School. The total number of shirts must not be more than 400. He has to supply more of type **A** than type **B** shirts. However the number of type **A** shirts must not be more than 300 and the number of type **B** shirts must not be less than 80 let x be number of type **A** shirts and y be the number of type **B** shirts.

(a) Write down in terms of x and y all the linear inequalities representing the information above. (4mrks)

(b) On the grid provided, draw the inequalities and shade the unwanted regions.(4mrks)

(c) Mr. Olik made profit of kshs. 600 per shirt of type **A** and shs. 400 per shirt of type **B**.

- (i) Use the graph to determine the number of shirts of each type that should be made to maximise the profit. (1mrk)



- (ii) Calculate the maximum possible profit. (1mrk)

24. The position of two towns **X** and **Y** are given to the nearest degree as **X(45° N, 110° W)** and **Y (45° N, 70° E)**. Take π 3.142, **R** = 6370km. Find:

(a) The distance between the two towns along the parallel of latitude in km. (2mrks)

(b) The distance between the towns in nautical miles. (2mrks)

(c) A plane flew from **X** to **Y** taking the shortest distance possible. It took the plane 15hrs to move from **X** and **Y**. Calculate its speed in Knots. (3mrks)

(d) Find the local time at **Y** when the local time at **X** on 10th April is 10.00pm. (3mrks)