

FORM FOUR CLUSTER KCSE MODEL5

MATHEMATICS PAPER 2 QUESTIONS

SECTION I (50 Marks)

Answer ALL questions

- Evaluate $\frac{1}{3}$ of $(2\frac{3}{4} - 5\frac{1}{2}) \times 3\frac{6}{7} \div \frac{9}{4}$
- Three grades A, B and C of rice were mixed in the ration 3:4:5. The cost per kilogram of each of the grades A, B and C were ksh 120, ksh 90 and ksh 60 respectively. Calculate:-
 - The cost of one kg of the mixture.
 - The selling price of 5 kg of the mixture given that the mixture was sold at 8% profit.
- The radius of a spherical ball is measured as 7 cm correct to the nearest centimeter. Determine to 2 decimal places, the percentages error in calculating the surface area of the ball.
- Expand and simplify the expression:
$$(a + \frac{1}{2})^4 + (a - \frac{1}{2})^4$$
- The equation of a circle is given as $x^2 + y^2 - 10y + 30 = 0$
 - Find the centre of the circle.
 - Given the circle in (i) above passes through the point (6, 9), determine its radius.
- Given that $x = -2$, find the values of y and z for the simultaneous equations.
$$x + y - z = -1$$
$$x - 2y + z = -7$$
- Akinyi, Nabwile, Atieno and Diva invested some money in business in the ratio of 7:9:10:14 respectively. The business realized a profit of shs.46, 800. They shared 12% of the profit equally and the remainder in the ratio of their contributions. Calculate the total amount received by Diva.
- A salesman earns a basic salary of shs 9,000 per months. In addition, due is also paid a commission of 5% for sales above shs 1,500. In a certain month, he sold goods worth shs 120,000 at a discount of 2½%. Calculate his total earnings that months.
- Given a function $y = 2 \sin 3x^\circ$ state:-
 - The period.
 - The amplitude.
- A positive two digit number is such that the product of the digit is 24. When the digits are reversed the number formed is greater than the original number by 18. Find the number.
- Make n the subject of the equation.

$$\frac{r}{p} = \frac{m}{\sqrt{n-1}}$$

12. Simplify

$$\frac{\sqrt{5}}{\sqrt{5}-2}$$

leaving your answer in the form

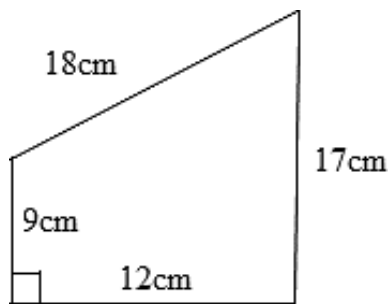
$$a\sqrt{b}+c$$

where a, b and c are integers

13. Find the value of y in the question:

$$\log_{10}(3y+2)-1 = \log_{10}(y-4)$$

14. Find the area of quadrilateral PQRS below:



15. Wambulwa can cultivate a piece of land in 7 hours while Nanjekho can do the same work in 5 hours. Find the time they would take to cultivate the piece of land when working together.

16. Two variables A and B are such that A varies partly as B and partly as the square root of B. Given that A = 30 when B = 9 and A = 16 when B = 14, find A when B = 36

SECTION II (50 Marks)

Answer any FIVE questions

17. The cash price of laptop was kshs 60,000. On hire purchase terms, a deposit of kshs 7,500 was paid followed by 11 monthly installments of kshs 6,000 each.
- (i) Calculate:
- The cost of a laptop on hire purchase terms.
 - The percentage increase of hire purchase price compared to the cash price.
- (ii) An institution was offered a 5% discount when purchasing 25 laptops of this kind on cash terms. Determine the amount of money paid by the institution.
- (iii) Two other institutions, X and Y bought 25 such laptops each. Institution X bought the laptops on hire purchase terms while Y bought laptops on cash terms with no discount by securing a loan from a bank. The bank charged 12% p.a compound interest for two years. Calculate how much more money institution Y paid than institution X.
18. A parent has two children whose age difference is 5 years. Twice the sum of the ages of the two children is equal to the age of the parent.
- (a) Taking x to be the age of the elder child, write an expression for:
- The age of the younger child.
 - The age of the parent.

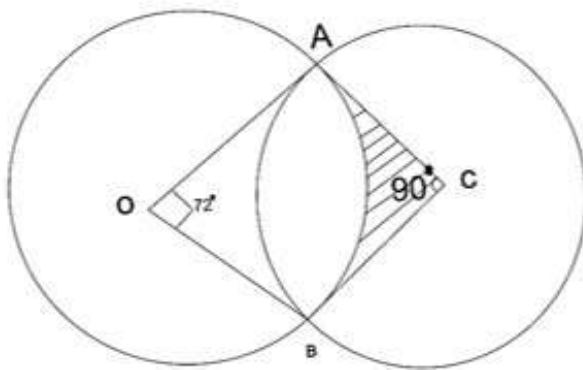
(b) In twenty years' time, the product of the children's ages will be 15 times the age of their parent.

(i) Form an equation in x and hence determine the present possible ages of the elder child.

(ii) Find the present possible ages of the parent.

(iii) Determine the possible ages of the younger child in 20 years' time.

19. Two circles of centres O and C intersect at points A and B . Given that $DA=8.4$ cm, $AC=7$ cm, $\angle AOB = 72^\circ$ and $\angle ACB = 90^\circ$.



Calculate:

(a) The area of the intersection of the circles.

(b) The area of the quadrilateral $OACB$

(c) The area of the shaded region

20. The table below shows values of x and some values of y for the curve $y = x^3 + 2x^2 - 3x - 4$

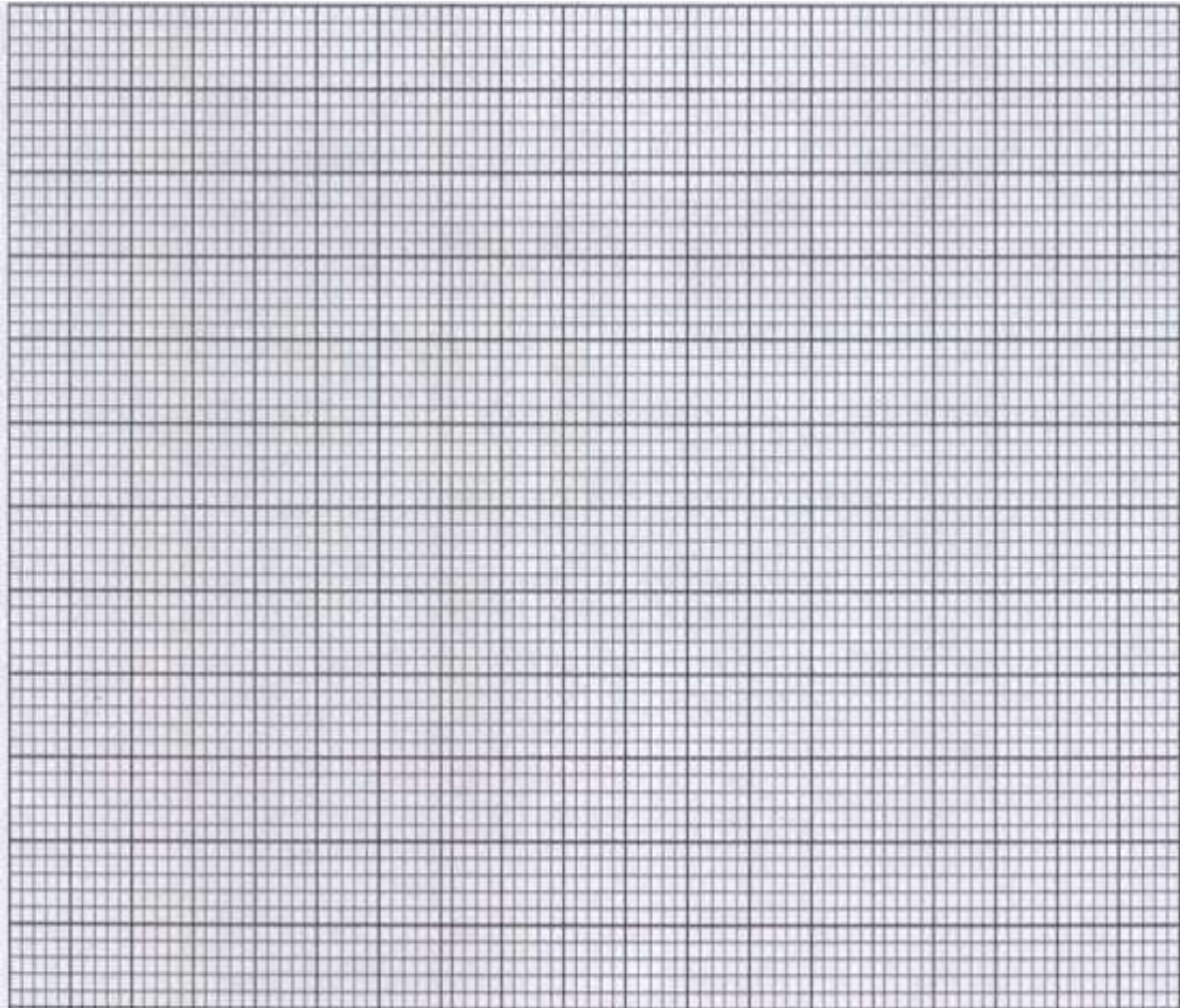
x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	-4.0	0.4		1.6	0		-4.0	-4.9			6

(i) Complete the table by filling in the missing values of y , correct to 1 d.p

(ii) On the grid provided, draw the graph of $y = x^3 + 2x^2 - 3x - 4$.

Use the scale: 1 cm represents 0.5 units on x -axis.

1 cm represents 1 units of y -axis.



(iii) Use the graph to:-

$$x^3 + 2x^2 - 3x - 4 = 0$$

(a) Solve the equation

(b) Estimate the co-ordinates of the turning points of the curve.

21. A bag contains blue, green and red pens of the same type in the ratio 8:2:5 respectively. A pen is picked at random without replacement and its colour noted.

(a) Determine the probability that the first pen picked is:

(i) Blue.

(ii) Either green or red.

(b) Using a tree diagram determine the probability that:

(i) The first two pens picked are both green.

(ii) Only one of the first two pens picked is red.

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