FORMULAE AND VARIATIONS

KCSE QUICK REVISION

Compilation of Possible Questions in Mathematics Likely to be examined in KCSE.

A Special Analysis of Prediction Questions that may be Tested in KCSE from this Topic in Form 3.

MATHEMATICS

SERIES 1

For Marking Schemes

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FORMULAE AND VARIATIONS

1. The volume Vcm^3 of an object is given by

$$V = \frac{2}{3}\pi r^3 \quad \frac{1}{sc^2} - 2$$

Express in term of π r, s and V

2. Make V the subject of the formula

$$T = \frac{1}{2} m (u^2 - v^2)$$

3. Given that $y = \frac{b - bx^2}{cx^2 - a}$ make x the subject

4. Given that $\log y = \log (10^n)$ make n the subject

5. A quantity T is partly constant and partly varies as the square root of S.

i. Using constants a and b, write down an equation connecting T and S.

ii. If S = 16, when T = 24 and S = 36 when T = 32, find the values of the constants a and b,

6. A quantity P is partly constant and partly varies inversely as a quantity q, given that p = 10 when q = 1.5 and p = 20, when q = 1.25, find the value of p when q= 0.5

7. Make y the subject of the formula $p = \frac{xy}{x-y}$

8. Make P the subject of the formula

$$P^2 = (P - q)(P-r)$$

9. The density of a solid spherical ball varies directly as its mass and inversely as the cube of its radius

When the mass of the ball is 500g and the radius is 5 cm, its density is 2 g per cm^3

Calculate the radius of a solid spherical ball of mass 540 density of 10g per cm^3

10. Make s the subject of the formula

$$\sqrt{P} = r \quad 1 - as^2$$

11. The quantities t, x and y are such that t varies directly as x and inversely as the square root of y. Find the percentage in t if x decreases by 4% when y increases by 44%

12. Given that y is inversely proportional to x^n and k as the constant of proportionality;

(a) (i) Write down a formula connecting y, x, n and k

(ii) If x = 2 when y = 12 and x = 4 when y = 3, write down two expressions for k in terms of n.
Hence, find the value of n and k.

(b) Using the value of n obtained in (a) (ii) above, find y when $x = 5\ ^1/_3$

13. The electrical resistance, R ohms of a wire of a given length is inversely proportional to the square of the diameter of the wire, d mm. If R = 2.0 ohms when d = 3mm. Find the vale R when d = 4 mm.

14. The volume $V cm^3$ of a solid depends partly on r and partly on r where rcm is one of the dimensions of the solid.
When r = 1, the volume is 54.6 cm^3 and when r = 2, the volume is 226.8 cm^3
(a) Find an expression for V in terms of r
(b) Calculate the volume of the solid when r = 4
(c) Find the value of r for which the two parts of the volume are equal

15. The mass of a certain metal rod varies jointly as its length and the square of its radius. A rod 40 cm long and radius 5 cm has a mass of 6 kg. Find the mass of a similar rod of length 25 cm and radius 8 cm.

16. Make x the subject of the formula

$$P = \frac{xy}{z + x}$$

17. The charge c shillings per person for a certain service is partly fixed and partly inversely proportional to the total number N of people.

(a) Write an expression for c in terms on N

(b) When 100 people attended the charge is Kshs 8700 per person while for 35 people the charge is Kshs 10000 per person.

(c) If a person had paid the full amount charge is refunded. A group of people paid but ten percent of organizer remained with Kshs 574000.
Find the number of people.

18. 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.

19. Make p the subject of the formula

$$A = \frac{-EP}{\sqrt{P^2 + N}}$$

For Marking Schemes/Answers

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