

FORMULAE

KCSE 1989 – 2012 Form 3 Mathematics

1. **1989 Q3 P2**
Make x the subject of the formula (3 marks)

$$N = \frac{p}{+bx}$$

2. **1993 Q10 P1**
Make n the subject of the formula (3 marks)

$$E = \sqrt{\frac{x(n-x)}{n-1}}$$

3. **1994 Q14 P1**
Make p the subject of the formula (3 marks)

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

4. **1995 Q 6 P1**
The volume $V\text{cm}^3$ of an object is given by $V = \frac{2}{3} \pi r^3 \left(\frac{1}{sc^2} - 2 \right)$
Express c in term of πr , s and V (3 marks)

5. **1996 Q 14 P1**
Make V the subject of the formula $T = \frac{1}{2} m (u^2 - v^2)$ (3 marks)

6. **1997 Q 13 P1**
Given that $y = \frac{b - bx^2}{cx^2 - a}$ make x the subject

7.	1998 8 Given that $\log y = \log (10x^n)$ make n the subject
8.	2000 Q 15 P2 Make x the subject of the formula $p = \left(\frac{xy}{z+x}\right)^{1/2}$
9.	2001 Q 10 P1 Make x the subject of the formula $S = W\sqrt{a^2 - x^2}$
10	2002 Q 3 P1 Make y the subject of the formula $p = \frac{xy}{x - y}$
11	2003 Q 3 P1 Make c the subject of t formula: $T = x\sqrt{c^2 + d^2}$ (3mks)
12	2004 Q 9 P2 Make b the subject $a = \frac{bd}{\sqrt{b^2 - d}}$
13	2005 Q 10 P1 Make P the subject of the formula $P^2 = (P - q)(P - r)$ (3 marks)
14	2006 Q 2 P2 Make s the subject of the formula (4 marks) $\sqrt{p} = r\sqrt{1 - as^2}$

15	<p>2007 Q 2 P2</p> <p>Given that $y = \frac{2x-z}{x+3z}$, express x in terms of y and z (3 marks)</p>
16	<p>2008 Q 2 P2</p> <p>Make h the subject of the formula (3marks)</p> $q = \frac{1+rh}{1-ht}$
17	<p>2010 Q 14 P2</p> <p>Make x the subject of the equation: $3y = y + \frac{p}{q + \frac{1}{x}}$ (3 marks)</p>
18	<p>2011 Q 3 P2</p> <p>Make s the subject of the formula. $W = 3\sqrt{\frac{s+t}{s}}$</p>
19	<p>2012 Q2 P2</p> <p>Make n the subject of the equation. (3 marks)</p> $\frac{r}{p} = \frac{m}{\sqrt{n-1}}$

FORMULAE MARKING SCHEME

1.	$\sqrt{(ax + bx)} = \frac{p}{N}$ $ax + bx = \left(\frac{p}{N}\right)^2$ $x(a + b) = \frac{p^2}{N^2}$ $x = \frac{p^2}{N^2(a + b)}$ <p style="text-align: center; margin-top: 20px;">1989Q3</p>
2.	$E^2 = \frac{xn - x^2}{n - 1}$ $E^2 (n-1) = xn - x^2$ $n E^2 - E^2 = xn - x^2$ $E^2 n - xn = -x^2 + E^2$ $n(E^2 - x) = E^2 - x^2$ $n = \frac{E^2 - x^2}{E^2 - x}$ <p>Or</p> $E^2 n - E^2 = xn - x^2$ $x^2 - E^2 = xn - E^2 n$ $x^2 - E^2 = n (x - E^2)$ $n = \frac{E^2 - x^2}{E^2 - x} \quad \text{or} \quad n = \frac{x^2 - E^2}{x - E^2}$

1993Q10

3.

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

$$P^2 + N = \frac{E^2 P^2}{A^2}$$

$$A^2 (P^2 + N) = E^2 P^2$$

$$A^2 P^2 + A^2 N = E^2 P^2$$

$$A^2 P^2 - E^2 P^2 = -A^2 N$$

$$P^2 (A^2 - E^2) = -A^2 N$$

$$P^2 = \frac{-A^2 N}{A^2 - E^2}$$

$$A^2 - E^2$$

$$P = \pm \sqrt{\frac{-AN^2}{A^2 - E^2}} \text{ or}$$

$$P = \pm \sqrt{\frac{AN^2}{E^2 - A^2}} \quad \mathbf{1994Q}$$

4.

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

$$\frac{3v}{2\pi r^3} + 2 = \frac{1}{sc^2}$$

$$\frac{3v + 4\pi r^3}{2\pi r^3} = \frac{1}{sc^2}$$

$$Sc^2(3v + 4\pi r^3) = 2\pi r^3$$

$$Sc^2 = \frac{2\pi r^3}{3v + 4\pi r^3}$$

$$c^2 = \frac{2\pi r^3}{s(3v + 4\pi r^3)}$$

	$C = \pm \sqrt{\frac{2\pi r^3}{s(3v+4\pi r^3)}}$ <p style="text-align: center;">1995Q6</p>	
5.	$\frac{2T}{M} = U^2 - V^2$ $V^2 = U^2 - \frac{2T}{M}$ $V = \sqrt{U^2 - \frac{2T}{M}}$ <p style="text-align: center;">1996Q14</p>	M1 M1 A1 3 marks
6.	$y(cx^2-a) = b-bx^2$ $bx^2 + y(cx^2-a) = b$ $bx^2 + cx^2y - ay = b$ $bx^2 + cx^2y = b + ay$ $x = \sqrt{\frac{b+ya}{b+yc}}$ <p style="text-align: center;">1997Q13</p>	M1 M1 M1 A1 3 Marks
7.	$\log y = \log(10x^n)$ $= \log y = \log 10 + n \log x$ $n \log x = \log y - \log 10$ $n = \frac{\log y - \log 10}{\log x}$ <p style="text-align: center;">1998Q8</p>	M1 M1 A1 3marks
8.	$p^2 = \frac{xy}{z+x}$ $P^2z + p^2x = xy$ $P^2z + x(y - p^2)$ $x = \frac{p^2 z}{y - p^2}$ <p style="text-align: center;">2000Q15</p>	 M1 M1 A1
9.	$s^2 = w^2(a^2 - x^2)$ $\frac{s^2}{w^2} = a^2 - x^2$	M1 M1

	$x^2 = a^2 - \frac{s^2}{w^2}$ $x = \pm \sqrt{a^2 - \frac{s^2}{w^2}}$ <p style="text-align: center;">2001Q10</p>	A1 3 marks
10.	$Px - Py = xy$ $Px = xy + Py$ $Px = y(x+p)$ $y = \frac{px}{x+p}$ <p style="text-align: center;">2002Q3</p>	B1 A1 2 marks
11.	$T^2 = x^2(c^2 + d^2) \text{ or } T^2$ $C^2 = \frac{T^2}{x^2} - d^2$ $C^2 = \pm \sqrt{\frac{T^2}{x^2} - d^2}$ <p style="text-align: center;">2003Q3</p>	M1 M1 A1 3 marks
12.	$a = \frac{bd}{\sqrt{(b^2-d)}}$ $a^2 = \frac{b^2 d^2}{b^2-d}$ $a^2 b^2 - a^2 d = b^2 d^2$ $a^2 b^2 - b^2 d^2 = a^2 d$ $b = \pm \sqrt{\frac{a^2 d^2}{a^2 - d^2}}$ <p style="text-align: center;">2004Q9</p>	
13.	$P^2 = (p-q)(p-r)$ $P^2 = -p^2 - pr - pq + qr$ $= -pr - pq + qr$ $pr + pq = qr$ $p(r+q) = qr$ $p = \frac{qr}{q+r}$ <p style="text-align: center;">2005Q10</p>	B1 M1 A1
14.	$p = r^2(1-as^2)$ $p = r^2 - ar^2s^2$ $s^2r^2 = r^2 - p$	M1 M1 A1 3 marks

	$s^2 = \frac{r^2 - p}{ar^2}$ $s = \pm \sqrt{\frac{r^2 - p^2}{ar^2}}$ <p style="text-align: center;">2006Q2</p>	
15.	$yx + 3yz = 2x - 2$ $yx - 2x = -3yz - z$ $x(y - 2) = -3yz - z$ $x = \frac{-3yz - z}{y - 2}$ <p style="text-align: center;">2007Q2</p>	M1 M1 A1 3 marks
16.	$q(1 - ht) = 1 + rh$ $q - 1 = rh + htq$ $q - 1 = h(r + tq)$ $h = \frac{q - 1}{r + tq}$ <p style="text-align: center;">2008Q2</p>	M1 A1 2 marks
17.	$3y - y = \frac{p}{q + \frac{1}{x}}$ $2y(q + \frac{1}{x}) = p$ $x = \frac{2y}{p - 2yq} \text{ or } \frac{-2y}{2yq - p}$ <p style="text-align: center;">2010Q14</p>	M1 M1 A1
18.	$w^3 = \frac{s+t}{s}$ $w^3s - s = t$ $s = \frac{t}{w^3 - 1}$ <p style="text-align: center;">2011Q3</p>	M1 M1 A1 3
19.	$\left(\frac{r}{p}\right)^2 = \frac{m^2}{n-1}$ $n-1 = \left(\frac{mp}{r}\right)^2$ $n = \left(\frac{mp}{r}\right)^2 + 1$ <p style="text-align: center;">2012 Q2 P2</p>	M1 M1 A1 3