2. *Fractions*

1	$\frac{(5)^{3\times\frac{2}{3}} \div 3^4}{3^{-\frac{3}{5}\times 5}} = \frac{5^2 \div 3^4}{3^{-3}}$ $= 5^2 \div 3^7$ $= \frac{25}{2187}$	M_1 M_1 A_1	Simplifying numerator simplify
2.	Num $\left(\frac{1}{5}\times 20\right)^{\frac{1}{2}}$ $= 4^{\frac{1}{2}}$ $= 2$ Denom. 8 x 1 x 25 $= 200$ $= \frac{2}{200}$ $\frac{1}{100}$	M1 M1 A1	 Or equivalent 0.01
		03	
3.	$\frac{\left(\frac{10}{7}-\frac{5}{8}\right)\times 2/3}{3/4+\frac{12}{7}\times 7/4\times 7/3}$ $\frac{\frac{45}{56}\times 2/3}{3/4+1}$ $\frac{15/28}{7/4}$ $15/28\times 4/7 = 15/49$	 M1 M1	 ✓ Application of bodmas Simplification of both

		A1	numerators and denominator
		03	
4	Let the digits be x and y The number becomes xy = 10x +y and x + y = 10 Reserved yx = 10y + x (10y + x) – (10x + y) = 54 10y + x – 10x – y = 54 9y – 9x = 54 y – x = 6 y – x = 6 y + x = 10 2y = 16 y = 8 x = 8-6 = 2 . . . The number is 28	M1 1M A1	Splitting of ones & tens and the reverse Solving of the simultaneous eqn. Answer
		3	
5	$\frac{3}{8}\left(\frac{38}{5}-\frac{55}{36}\times\frac{12}{5}\right)$ $=\frac{3}{8}\times\frac{59}{15}$ $=\frac{59}{40}\qquad=1\frac{19}{40}$		M_1 M_1 A_1
6	$2.181818\ldots\times 100 = 218.1818\ldots$ $2.181818\ldots\times 1\ldots\ldots\quad 2.1818\ldots$ Difference = 216 Difference of multipliers = 100 – 1 = 99 Fraction $=\frac{216}{99}=\frac{72}{33}=\frac{24}{11}$		B1 M1A1 3
7		M_1	For +ve index

	$\left(\frac{10^5}{3^5}\right)^{\frac{2}{5}} \times \left(\frac{3^2}{10^4}\right)^{\frac{1}{2}}$ $\frac{100}{9} \times \frac{3}{100}$ $\frac{1}{3}$	M_1 M_1 $\frac{A_1}{3}$	
8.	$\frac{\frac{6}{7}of\frac{14}{3} \div 80 \times -\frac{20}{3}}{-2\times5+(14\div7)\times3}$ $\frac{4 \div 80 \times -\frac{20}{3}}{-2\times5+2\times3}$ $\frac{\frac{1}{20}\times-\frac{20}{3}}{-10+6}$ $\frac{-1/3}{-4}$ $\frac{1}{3}\times\frac{1}{4}=\frac{1}{12}$	M1 M1 M1 A1	
		04	
9.	Let the number of chicken be x Turkeys will be x + 6 ¼x + 1/3 (x + 6) = 30 ¼x + 1/3x + 2 = 30 7/12x = 28 = 48 Number of chickens = 48 Number of turkeys = 48 + 6 = 54	B1	For 48

	Total number of birds = 54 + 48 = 102	B1	For 102
		02	

11. $\frac{-4 \text{ of } (-4\ -3) + -3-2)}{-12 + 3 + 5}$

$\frac{-4 \text{ of } (-7-3-2)}{-4}$ M1 for -4

$= \frac{48}{-4}$ M1 for 48

$= -12$ A1

3

12.	(a) (i) ratio $r = \frac{3}{100} \div \frac{3}{10}$ $r = \frac{3}{100} \times \frac{10}{3} = \frac{1}{10}$ $ii) S_n = \frac{\frac{3}{10}\left(1-\frac{1}{10}\right)^{n-1}}{1-\frac{1}{10}}$ $S_n = \frac{\frac{3}{10}\left(\frac{9}{10}\right)^{n-1}}{\frac{9}{10}}$ $S_n = \frac{3}{10} \times \frac{10}{9}\left(\frac{9}{10}\right)^{n-1}$ $S_n = \frac{1}{3}\left(\frac{9}{10}\right)^{n-1}$ $iii) T_8 = \frac{3}{10}\left(\frac{1}{10}\right)^{8-1}$ $= \frac{3}{10}\left(\frac{1}{10}\right)^{7}$ $= \frac{3}{10} \times \frac{1}{10^7} = \frac{3}{100,000,000}$ (b) 1st bounce 30m 2nd ¾ x 30 = 22.5m 3rd ¾ x 22.5 = 16.85m 4th ¾ x 16.85 = 12.64m 5th ¾ x 12.64 = 9.48m 6th ¾ x 9.48 = 7.11m 7th ¾ x 7.11 = 5.3325m 8th ¾ x 5.3325 = 3.9993m 9th ¾ x 3.9993 = 2.9995m 10th ¾ x 2.9995 = 2.2496m ≅2.25 Or using formula $T_{10} = 30(\frac{3}{4})^{10-1} = 30(\frac{3}{4})^{9}$	M1 A1 M1 M1 A1 M1 A1 M1 M1 M1 2 d.p	Every four Every four

	= 30 x 0.07508 ≅2.2524m ≅ 2.25m	M1 A1	
13.	$\frac{\frac{5}{12}}{\frac{43}{20}} = \frac{25}{43}$	**M1** **M1** **A1**	For num For den
		03	
14.	$Numerator \rightarrow 7 + -6 = 1$ $Deno\min ator \rightarrow -9 + 2 + 4 = {}^{-}\ 3$ $= -1/3$	**M1** **M1** **A1**	
		03	
15	<u>-8-39+5</u> -1-3x2 = <u>-42</u> -7 = 6	M1 <u>A1</u> 2	Numerators & Denominators
16	$\frac{\sqrt[3]{13824} - 4}{3 + 2 - 35}$ $= \frac{\sqrt[3]{13824} - 4}{-30}$ $13824 = \sqrt[3]{2^9 \times 3^3} = 2^3 \times 3^1 = 24$ $\frac{24 - 4}{-30} = \frac{-2}{3}$	M1 M1 A1	Simplified denominator $\sqrt[3]{}$ Method shown Show how to get factors of 13824
		3 marks	

17	$100r = 193.\dot{3}\dot{3}.....$ $10r = 19.\dot{3}\dot{3}.....$ $90r = 174$ $r = \frac{174}{90}$ $100r = 25.\dot{2}\dot{5}.....$ $r = 0.\dot{2}\dot{5}.....$ $99r = 25$ $r = \frac{25}{99}$ $\frac{174}{90} + \frac{25}{99}$ $= \frac{2164}{990}$ $= 2\frac{92}{445}$	B1 B1 B1	
		3	

18. *½ x 7/2 = 3/2 x 1 5/6 ¾ x 5/2 x X*

7/4 + 3/2 x 11/2 = 15/4

7/4 + 11/4 = 18/4

∴ 18/4 ÷ 15/4

B1

18/4 x 4/15 = 6/5 = 1 1/5

A1

19. *$^{2}/_{5}$ ÷ ½ 0f $^{4}/_{9} - 1^{1}/_{10}$*

= $^{2}/_{5}$ ÷ ½ X $^{4}/_{9} - ^{11}/_{10}$

= $^{2}/_{5}$ x $^{9}/_{2} - ^{11}/_{10}$

= $^{9}/_{5} - ^{11}/_{10} = ^{18-11}/_{10} = ^{7}/_{10}$

$^{1}/_{8} - ^{1}/_{6}$ X $^{3}/_{8} = ^{1}/_{8} - ^{1}/_{16}$

$= ^{2-1}/_{16} = ^{1}/_{16}$

$\frac{^{2}/_{5} \div ½ \text{ 0f } ^{4}/_{9} - 1^{1}/_{10}}{^{1}/_{8} - ^{1}/_{6} \text{ of } ^{3}/_{8}} = \frac{^{7}/_{10}}{^{1}/_{16}}$

$= ^{7}/_{10}$ X $^{16}/_{1}$

$= ^{56}/_{5} = 11^{1}/_{5}$

20. *BODMAS*

$^{3}/_{7}$X $^{7}/_{3} = 1$

$^{9}/7$ X 1 = 9/7

¾ + $^{9}/_{7}$ = 21 + 36 = 57 *M1*

28 28

$^{9}/_{7} - ^{3}/_{8}$ = 72 – 21 = 51 x $^{2}/_{3} = ^{17}/_{28}$ *M1*

$^{57}/_{28} \times {}^{28}/_{17} = 3\,{}^{6}/_{17}$ A1

21. $\frac{2}{5} \times \frac{9}{2} - \frac{11}{10}$

$\frac{1}{8} - \frac{1}{16}$

$= \frac{7}{10} \times \frac{16}{1}$

$= \frac{56}{5} = 11\,\frac{1}{5}$

22. ${}^{3}/_{8}\,({}^{38}/_{5} - {}^{55}/_{36} \times {}^{12}/_{5})$

${}^{3}/_{8} \times {}^{59}/_{15} = {}^{59}/_{40} = 1^{19}/_{40}$

23. Numerator

$\frac{({}^{2}/_{5} \times {}^{25}/_{18}) \div {}^{5}/_{2} \times 24}{{}^{7}/_{3} - (\frac{1}{4} \times 12) \div {}^{5}/_{3}}$

${}^{9}/_{5} \times {}^{25}/_{18} = {}^{5}/_{2} \div {}^{5}/_{3} \times 24$

${}^{5}/_{2} \times {}^{3}/_{5} \times 24 = 36$

$7/3 - \frac{1}{4} \times 12 \div 5/3$

$7/3 - 3 \times 3/5$

$\therefore \frac{36}{{}^{8}/_{15}} = 67.50 = 67\,\frac{1}{2}$

${}^{7}/_{3} - 3 \times {}^{3}/_{5}$

24. Let X be money raised

Teachers house $= {}^{1}/_{7}\,x$

Classrooms $= {}^{2}/_{3} \times {}^{6}/_{7} = {}^{4}/_{7}x$

Remainder $= {}^{1}/_{3} \times {}^{6}/_{7} = {}^{2}/_{7}x$

${}^{2}/_{7}\,x = 300000$

$x =$ Shs.1050000