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 A1	✓ Application of bodmas Simplification of both 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	$2.181818 \ldots\ldots \times 100 = 218.1818 \ldots\ldots$ $2.181818 \ldots\ldots \times 1 \ldots\ldots \quad 2.1818 \ldots\ldots$ 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.	$\frac{\frac{6}{7} of \frac{14}{3} \div 80 \times -\frac{20}{3}}{-2 \times 5 + (14 \div 7) \times 3}$ $\frac{4 \div 80 \times -\frac{20}{3}}{-2 \times 5 + 2 \times 3}$ $\frac{\frac{1}{20} \times -\frac{20}{3}}{-10 + 6}$ $\frac{-1/3}{-4}$ $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$	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 Total number of birds = 54 + 48 = 102	B1 B1	For 48 For 102

		02	

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

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

$= \dfrac{48}{-4}$ 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 $T_{10} = 30(\frac{3}{4})^{10-1} = 30(\frac{3}{4})^{9}$ = 30 x 0.07508 ≅2.2524m ≅ 2.25m	M1 A1 M1 M1 A1 M1 A1 M1 M1 M1 A1 2 d.p M1 A1	Every four Every four

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	

16 15	$\frac{\sqrt[3]{13824} - 4}{3 + 2 - 35}$ $= \frac{\sqrt[3]{13824} - 4}{-7 - 30}$ $13824 = \sqrt[3]{2^9 \times 3^3} = 2^3 \times 3^1 = 24$ $\frac{24 - 6}{-30} = \frac{-2}{3}$	M1 A1 2	Numerators & Denominators	M1 M1 A1 3 marks	Simplified denominator $\sqrt[3]{}$ Method shown Show how to get factors of 13824

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 $\frac{7}{2}$ = $\frac{3}{2}$ x $1\frac{5}{6}$ ¾ x $\frac{5}{2}$ x X

$\frac{7}{4} + \frac{3}{2} \times \frac{11}{2} = \frac{15}{4}$

$\frac{7}{4} + \frac{11}{4} = \frac{18}{4}$

$\therefore \frac{18}{4} \div \frac{15}{4}$ B1

$\frac{18}{4} \times \frac{4}{15} = \frac{6}{5} = 1\frac{1}{5}$ A1

19. $^2/_5 \div ½$ 0f $^4/_9 - 1^1/_{10}$

$= {}^2/_5 \div ½ \; X \; {}^4/_9 - {}^{11}/_{10}$

$= {}^2/_5 \times {}^9/_2 - {}^{11}/_{10}$

$= {}^9/_5 - {}^{11}/_{10} = {}^{18\text{-}11}/_{10} = {}^7/_{10}$

$^1/_8 - {}^1/_6 \; X \; {}^3/_8 = {}^1/_8 - {}^1/_{16}$

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

$\frac{^2/_5 \div ½ \text{ 0f } {}^4/_9 - 1^1/_{10}}{^1/_8 - {}^1/_6 \text{ of } {}^3/_8} = \frac{^7/_{10}}{^1/_{16}}$

$= {}^7/_{10} \; X \; {}^{16}/_1$

$= {}^{56}/_5 \quad = 11^1/_5$

20. *BODMAS*

$^3/_7 X \; {}^7/_3 = 1$

$^9/7 \; X \; 1 = 9/7$

¾ + $^9/_7$ = 21 + 36 = 57 *M1*

28 28

$^9/_7 - {}^3/_8 = 72 - 21 = 51 \times {}^2/_3 = {}^{17}/_{28}$ *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. $\frac{3}{8}\left(\frac{38}{5} - \frac{55}{36} \times \frac{12}{5}\right)$

$\frac{3}{8} \times \frac{59}{15} = \frac{59}{40} = 1\frac{19}{40}$

23. Numerator

$\frac{\left(\frac{9}{5} \times \frac{25}{18}\right) \div \frac{5}{2} \times 24}{\frac{7}{3} - \left(\frac{1}{4} \times 12\right) \div \frac{5}{3}}$

$\frac{9}{5} \times \frac{25}{18} = \frac{5}{2} \div \frac{5}{3} \times 24$

$\frac{5}{2} \times \frac{3}{5} \times 24 = 36$

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

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

$\therefore \frac{36}{\frac{8}{15}} = 67.50$

$= 67\frac{1}{2}$

$\frac{7}{3} - 3 \times \frac{3}{5}$

24. Let X be money raised

Teachers house $= \frac{1}{7}x$

Classrooms $= \frac{2}{3} \times \frac{6}{7} = \frac{4}{7}x$

Remainder $= \frac{1}{3} \times \frac{6}{7} = \frac{2}{7}x$

$\frac{2}{7}x = 300000$

$x =$ Shs.1050000