

**UK Answers**

**Yellow**



**Challenge Cards**

1. Ratio is 3:5 in the 16 min swim  
⇒ 6:10 min ratio

Downstream

6 min x 50m = 300 m

Upstream

10 min x 30m = 300m

Altogether 600m

2a.     2 7 4  
       1 3 9  
   + 5 8 6  
   -----  
     9 9 9

b.     6 4 8  
   - 2 7 9  
   -----  
     3 6 9

3. Every emu gives 3 sheep  
⇒ 1:3 ratio giving 14 legs  
266 legs ÷ 14 legs = 19  
⇒ 19 emus: 57 sheep

4. 1 + 2 + 3... + 21 = 231  
⇒ 21 years old

5. 4 x £27.50 = £110  
£110 ÷ 5 = £22 per meal

6. Running days  
Nov = 17  
Dec = 31  
Jan = 28

Total 76 days  
⇒ 76 x 8 = 608 hours

Example answer  
NY to LA is 2432 miles  
2432 ÷ 76 ÷ 8 = 4 mph

7.  $3/8 + 0.25 + 5/16 = 15/16$   
Delivery ⇒ 1/16  
 $£112 ÷ 16 = £7$

8. Combined printing pages  
1 + 2, 19 + 20  
3 + 4, 17 + 18  
Ans 5 + 6, 15 + 16

9. 4 points x 6 games x 2 sets  
x 4 matches =  
192 points altogether

10. Triangle operations  
 $4+6+8 = 18 \rightarrow 1+8 = 9$   
 $6+7+2 = 15 \rightarrow 1+5 = 6$   
 $11+7+3 = 21 \rightarrow 2+1 = 3$

11. 1<sup>st</sup> child 26 x £30 = £780  
2<sup>nd</sup> child 12 x £20 = £240  
3<sup>rd</sup> child 2 x £10 = £ 20  
Total 40 players at £1040

12. 

X	X	X	
	X	X	X
X	X		X
X		X	X

Other solutions possible

13. Process of elimination  
Mystery factor is 37

14. In 1 minute she climbs  
10m – 2m slip = 8m  
 $3794m ÷ 8m = 474.25min$   
474 min = 7 hours 54 minutes



15. Ratio is 12 : 8 : 3  
 [using whole numbers]  
 $\pounds 460 \div 23 = \pounds 20$  per unit  
 Eldest =  $12 \times \pounds 20 = \pounds 240$   
 Middle =  $8 \times \pounds 20 = \pounds 160$   
 Youngest =  $3 \times \pounds 20 = \pounds 60$
16. Work in reverse  
 $\underline{3} \times 3 \times 2 \times 5 \times 4 = 360$
- 17a. Audis =  $4/40 = 1/10$   
 b. Volvos =  $16/40 = 40\%$   
 c. Citroens =  $12/40 = 30\%$   
 $30\%$  of  $360^\circ \Rightarrow 108^\circ$
18. In Singapore  
 $4,608,595 \div 620 = 7,433$   
 people per  $\text{km}^2$   
 UK potential  
 $244,820 \times 7433 =$   
 $1,819,747,060$  people  
 New Zealand potential  
 $268,680 \times 7433 =$   
 $1,997,098,440$  people
19. Process of elimination  
 The mystery number is 87,410
20.  $46 \div 2 = 23$   
 Sylvester  $23 + 5 = 28$   
 Claude  $23 - 5 = 18$
21. "Guess & revise" or algebra  
 Tony has  $x$  games as Pig  
 $x + 2x + 2x + (2x - 4) = 38$   
 $\Rightarrow 7x - 4 = 38$   
 $\Rightarrow 7x = 42$ , so  $x = 6$  games  
Answer  
 Tony 6, Pete 8, Maria/Sonya 12

22. "Guess & revise" or algebra  
 $x =$  wedding balloons  
 $x + 2x + (x - 12) = 100$   
 $\Rightarrow 4x - 12 = 100$   
 $\Rightarrow 4x = 112$ , so  $x = 28$   
 28 wedding balloons  
 56 birthday balloons  
 16 New Year's balloons
23. Rule is  
 top number  $\times 7$  then  $- 2$   
 Work in reverse  
 $(54 + 2) \div 7 = 8$   
 Use rule  
 $(9 \times 7) - 2 = 61$   
 Work in reverse  
 $(47 + 2) \div 7 = 7$
24. Total distance  
 $350 \text{ miles} \times 3 = 1050 \text{ miles}$   
 Total time  
 $3 \text{ hr} + 7 \text{ hr} = 10 \text{ hours}$   
 Speed  
 $1050 \text{ miles} \div 10 \text{ hours} =$   
 $105 \text{ mph}$  average speed
25. Tom  $365 \div 8 = 46$  boxes  
 Hilary  $182 \div 8 = 23$  boxes  
 Claire 12 boxes  
 Rebecca  $26 \div 8 = 4$  boxes  
 John 1 box  
Answer 86 boxes
26.  $54 - 30 - 15 = 9$  (S)  
 $30 - 15 - 9 = 6$  (R)  
 $\Rightarrow R=6$  &  $S=9$



27. Square  
 $75\text{m} \times 75\text{m} = 5625\text{m}^2$   
Rectangular  
 $100 \times 50 = 5000\text{m}^2$   
Circular [the 'best' in size]  
 Radius = Circum  $\div 2\pi$   
 $300 \div 2 \div \pi = 47.75\text{m}$   
 Area =  $\pi \times (47.75)^2 = 7163 \text{ m}^2$
28. You start 50 steps (st) ahead  
 $50 + (10 \times 10\text{st}) = 150 \text{ st}$   
 Friend runs  $10 \times 15\text{st} =$   
 150 st  
Answer You cover 100 steps
29.  $1/2 - 1/3 = 1/6$   
 $1/6 = 165 \text{ pages}$   
 $\Rightarrow 165 \times 6 = 990 \text{ pages}$   
 $1/3 \text{ takes } 11 \text{ hours}$   
 $\Rightarrow 3 \times 11 = 33 \text{ hours total}$
30. Gas = 2 miles per litre [L]  
 Petrol = 1.5 miles per L  
500 miles on Gas  
 $500\text{m} \div 2\text{m/L} = 250 \text{ L}$   
 $250\text{L} \times 40\text{p} = \text{£}100$   
500 miles on Petrol  
 $500\text{m} \div 1.5 \text{ m/L} = 333.33\text{L}$   
 $333.33 \times 80\text{p} = \text{£}266.67$   
Answer  
 $\text{£}266.67 - \text{£}100 = \text{£}166.67$
31.  $60\text{cm} \div 10\text{cm} \Rightarrow 6 \text{ tiles}$   
 $228\text{cm} \div 12\text{cm} \Rightarrow 19 \text{ tiles}$   
 Total is  $6 \times 19 = 114 \text{ tiles}$

32. Single triangles 16  
 Size "4" triangles 6  
 Size "9" triangles 3  
 Size "16" triangle 1  
Total triangles 26
33. "Guess & revise" or algebra  
 Lucia has 'x' cd's  
 $x + (x + 50) + 100 = 3x$   
 $\Rightarrow 2x + 150 = 3x$   
 $\Rightarrow x = 150$   
 Lucia 150 cd's  
 Anja 450 cd's  
 Sophia 200 cd's
34. Possible combinations  
 3 courses =  $3 \times 3 \times 2 = 18$   
 2 courses =  $(3 \times 5) + (3 \times 2) = 21$   
 Total = 39 combinations
35. "Guess & revise"  
 Max is 58 years old  
 Father is 87 years old
36. Create a list  
 [30 chairs  $\rightarrow$  102 legs]
- | <u>Broken</u> | <u>Repaired</u> | <u>Total legs</u> |
|---------------|-----------------|-------------------|
| 1             | 29              | 119               |
| 2             | 28              | 115               |
| 3             | 27              | 111               |
| 18            | 12              | 102               |
- Answer  
 $18 \times 3 \text{ legs} = 54 \text{ legs}$   
 $12 \times 4 \text{ legs} = 48 \text{ legs}$   
 $54 + 48 = 102 \text{ legs in total}$   
 $18 / 30 = 60\% \text{ broken}$



37.

	3	10	
11	4	6	5
8	7	9	2
	12	1	

38.  $3 + 6 + 9 + 12 + 15 \dots + 54 =$   
513 words in 18 days

39. Arithmetic reasoning

$\& = 13$

$@ = 7$

$\# = 1$

$\&@ \# = 21$

$25 = \&\#\&$

$41 = \&\&\#\#\&$

40. Total Garden Area  
 $18\text{m} \times 8\text{m} = 144\text{m}^2$

Lawn Area

$15\text{m} \times 5\text{m} = 75\text{m}^2$

Paving area

$144\text{m}^2 - 75\text{m}^2 = 69\text{m}^2$

Cost

$69\text{m}^2 \times \text{£}10 = \text{£}690$

41.  $4 \times 6 \div 2 = 12$

$12 \times 3 \div 0.5 = 72$

$8 \times 2 \div 0.2 = 80$

42. Time lapses are 4, 12 and 7.

All factors of 84.

Midday Sunday + 84 hours

$\Rightarrow$  Midnight Wednesday

43. "Guess & revise" or algebra  
Balfe ate 'x' ants

$x + (x+240) + (x-140) = 940$

$\Rightarrow 3x - 100 = 940$

$\Rightarrow 3x = 840$

$\Rightarrow x = 280$

Balfe 280 ants

Potts 520 ants

Mini 140 ants

44a.  $11 \times 12 \times 13 = 1716$

b.  $93 + 95 + 97 + 99 = 384$

c.  $3 + 29 + 31 + 37 = 100$

[other solutions possible]

45a.  $10 / 30 = 1/3$

b. 30 students

c.  $12 / 30 = 40\%$

46. 'New' (no doubling) handshakes

$3 + 2 + 1 + 0 = 6$

'New' female kisses

$3 + 2 + 1 + 0 = 6$

'New' mixed gender kisses

$4 + 4 + 4 + 4 = 16$

Total kisses = 22

47a. Old showers – old time

$140\text{L} \times 365 = 51,100\text{L}$

Old showers – new time

$140\text{L} \div 7 \text{ min} = 20\text{L/min}$

$80\text{L} \times 365 = 29,200\text{L}$

Savings

$51,100 - 29,200 = 21,900\text{L}$

b. New showers

$60\% \times 80\text{L} = 48\text{L}$

$48\text{L} \times 365 = 17,520\text{L}$



48. 13 years x 21 students =  
273 students in total
- 49a. "Guess & revise" or algebra  
 $y \times 2y = 722$   
 $2y^2 = 722$   
 $y^2 = 361$ , so  $y = 19$   
 Answer:  $19 \times 38 = 722$
- b. Doubling pattern  
 512 1024 2048
50. 4.33 bags = 65 gold coins  
 $65 \div 4.33 = 15$  gold coins  
 $\Rightarrow$  1 bag = 15 gold coins
51. Create / use a calendar  
 a. Friday 31<sup>st</sup> October  
 b. Wednesday 22<sup>nd</sup> October
52. Arithmetic reasoning  
 $\Psi = 2$   
 $\Pi = 3$   
 $\emptyset = 4$
53.  $1/2 \times 2/3 = 2/6$   
 $\Rightarrow 1/3 = \text{legs}$   
 $\text{Legs} \div 4 = 10\text{cm}$   
 $\Rightarrow 1/3 \div 4 = 1/12$   
 $\Rightarrow 1/12 = 10\text{cm}$   
 $\Rightarrow 12 \times 10 = 120\text{cm}$  in total
54. Previous year  
 40 girls & 80 boys  
 Recruitment  
 $168 - 120 = 48$  players  
 Girl / boy ratio is 3:1  
 $\Rightarrow 36$  girls & 12 boys  
 New season  
 76 girls & 92 boys

55. Covert to percentages  
 $10\% (w) + 25\% (r) + 17.5\% (g)$   
 $+ 35\% (e) = 87.5\%$   
 Food  $\Rightarrow 12.5\%$   
 $12.5\%$  of  $\pounds 880 = \pounds 110$
56. 

<u>Denom</u>	<u>Sol.1</u>	<u>Sol.2</u>
50p	$x1 = 50\text{p}$	$x 1 = 50\text{p}$
20p	$x4 = 80\text{p}$	$x 2 = 40\text{p}$
10p	$x4 = 40\text{p}$	$x10 = 100\text{p}$
5p	$x6 = 30\text{p}$	$x 2 = 10\text{p}$
57. "Guess & revise" or algebra  
 $x = \text{child ticket}$   
 $2x + (2x + 10) = 40$   
 $\Rightarrow 4x = 30$ , so  $x = 7.5$   
 Child ticket  $\pounds 7.50$   
 Adult ticket  $\pounds 12.50$
- 58a. A third of 60 = 20  
 A fifth of 60 = 12  
Answer  $\Rightarrow 60$
- b. A quarter of 40 = 10  
 A fifth of 40 = 8  
Answer  $\Rightarrow 40$
59. Total number of students =  $x$   
 $x(1 - (2/5 + 1/10 + 3/8)) = 25$   
 $\Rightarrow x(1 - 35/40) = 25$   
 $\Rightarrow x/8 = 25$   
 $\Rightarrow x = 200$
60. Jan = 60kg  
 Feb =  $60 \times 1.4 = 84\text{kg}$   
 Mar =  $84 \times 1.5 = 126\text{kg}$   
 Apr =  $126 + (126 \div 6) = 147\text{kg}$   
Overall increase  $\Rightarrow$   
 $(147 \div 60) \times 100 = 245\%$

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61.  $160 \div 5 = 32$  [median]  
Gary's scores  
42, 37, 32, 27, 22
62.  $260\text{km} \times 1000\text{m} \times 100\text{cm} = 26 \times 10^6 \text{ cm}$   
 $26 \times 10^6 \div 72,375 \text{ racquets} \Rightarrow 359 \text{ cm per racquet}$
63. Make a costs table  
Answer  
 $200 \text{ cans} \times 8\text{p} = \text{£}16$   
 $100 \text{ bottles} \times 5\text{p} = \text{£}5$
64. "Guess & revise"  
a.  $17 + 37 + 47 = 101$   
or  $11 + 43 + 47 = 101$   
b.  $7 \times 11 \times 13 = 1001$
65. Create a list  
[30 questions  $\rightarrow$  100 points]
- | <u>Correct</u> | <u>Incorrect</u> | <u>Score</u> |
|----------------|------------------|--------------|
| 30             | 0                | 210          |
| 29             | 1                | 200          |
| 28             | 2                | 190          |
- Answer  
 $19 \text{ correct} = 19 \times 7 = 133 \text{ points}$   
 $11 \text{ incorrect} = 11 \times 3 = 33 \text{ points}$   
Total =  $133 - 33 = 100 \text{ points}$   
in 30 responses
66. "Guess & revise"  
Martin 48 years  
Janice 36 years  
Camilla 12 years  
Andrew 9 years

67.  $125 \div 5 = 25$  [median]  
Drank 25 cans in 3<sup>rd</sup> hour
- Above median  
 $25 + 7 = 32$       $32 + 7 = 39$   
Below median  
 $25 - 7 = 18$       $18 - 7 = 11$
- Hourly consumption of cans  
39, 32, 25, 18, 11
68. Running speed  
 $18\text{km/h} \div 60 = 300\text{m per min}$   
 $300 \div 60 = 5\text{m per sec}$
- 1<sup>st</sup> meet half way around  
 $200\text{m} \div 5\text{m/s} = 40 \text{ sec}$
- Answer  
2<sup>nd</sup> time  $400\text{m} \rightarrow 80 \text{ sec}$   
3<sup>rd</sup> time  $600\text{m} \rightarrow 120 \text{ sec [2 min]}$
69. Arithmetic reasoning  
 $21 \times 6 = 126$
70.  $x = \text{number of apples}$   
 $x + (x + 5) + (x - 1) = 25$   
 $\Rightarrow 3x + 4 = 25$   
 $\Rightarrow x = 7 \text{ apples}$
- $y = \text{cost of a tomato}$   
 $2(7y) + 6y = \text{£}6$   
[apples are twice the cost]  
 $\Rightarrow 20y = \text{£}6, \text{ so } y = 30\text{p}$
- Oranges      $12 \times 50\text{p} = \text{£}6.00$   
Apples        $7 \times 60\text{p} = \text{£}4.20$   
Tomatoes     $6 \times 30\text{p} = \text{£}1.80$



71. Pattern  
 13, 15, 19, 20  
 23, 25, 29, 30, 33  
 35, 39, 40, 43, 45  
 • 45 minutes on 14<sup>th</sup> day  
 • Total minutes = 409  
 $409 \div 14 = 29 \text{ min } 13 \text{ sec.}$

72. 5 years ago  
 Igor 5 and Murray 35  
 Igor is 10 years old now  
 Murray is 40 years old now

73. Mark  
 Chris  
 Sally  
 Cathleen  
 Douglas  
 Mace  
 Penny

74. Create a costs list  
Answer  
 4 x £15 caps     £60  
 5 x £8 broad     £40  
 2 x £10 design   £20

75. Mean = 7  
 Therefore  
 1,2,3,4,5,6,7,8,9,10,11,12,13  
 Dario is turning 13  
 Blown out  $13 \times 7 = 91$  candles

- 76a. Arithmetic reasoning  
 $K = 5$   
 $L = 1$   
 $M = 0$   
 $\Rightarrow 101 \times 5 = 505$   
 b.  $101^2 = 10201$

77.  $b = \text{blueberry}$   
 $b + 3b + (b + 10) = 90$   
 $\Rightarrow 5b + 10 = 90$   
 $\Rightarrow b = 16$

Vanilla = 48  
 Chocolate = 26  
 Blueberry = 16

78.  $8465.4 \times 5 = 42,327\text{m}$   
 $42,327 - 7879 - 8475 - 8501 -$   
 $8598 = 8874\text{m}$   
 Everest  $\Rightarrow 8874\text{m}$

79.  $3 \times 6 \times 2 \div 9 = 4$   
 $1 \times 10 \times 7 \div 2 = 35$   
 $4 \times 5 \times 3 \div 12 = 5$

80. Side walls  
 $6\text{m} \times 2.5\text{m} = 15\text{m}^2 \times 2 = 30\text{m}^2$   
End walls  
 $4\text{m} \times 2.5\text{m} = 10\text{m}^2 \times 2 = 20\text{m}^2$   
Ceiling  
 $6\text{m} \times 4\text{m} = 24\text{m}^2$   
Total  
 $30 + 20 + 24 = 74\text{m}^2$   
Subtractions  
 Window  $1.5 \times 0.8 = 1.2\text{m}^2$   
 Door  $2 \times 1 = 2\text{m}^2$   
Total area to paint  
 $74\text{m}^2 - 3.2\text{m}^2 = 70.8\text{m}^2$

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E81. Set-up a 'costs' table  
     [14 cakes → £160]  
 More than one solution

Round	Square	Pyramid	Cost
1	5	9	£184

Answers include

4	3	7	£160
4	10	2	£160

E82. Ratio of speed  
 up : down → 30 : 70  
 [3 x 7 = 7 x 3]  
 Upstream  
 30m/h x 70 hrs = 2100m  
 Downstream  
 70m/h x 30 hrs = 2100m  
Total  
 4.2km in 100 hours

E83. 10 showbag combinations  
 [0c, 6d, 2s] [0c, 3d, 6s]  
 [0c, 0d, 10s] [1c, 1d, 7s]  
 [1c, 4d, 3s] [2c, 2d, 4s]  
 [2c, 5d, 0s] [3c, 3d, 1s]  
 [3c, 0d, 5s] [4c, 1d, 2s]

E84. Set-up a 'legs' table

<u>Birds</u>	<u>Cats</u>	<u>Dogs</u>	<u>Legs</u>
15	1	2	42
12	2	4	48
9	3	6	54
6	4	8	60

Answer

6 birds [12 legs]  
 4 cats [16 legs]  
 8 dogs [32 legs]

E85. 558 points ÷ 4 = 139.5 median  
 Difference is 39 ÷ 3 = 13  
 Therefore 13 ÷ 2 = 6.5

Answer

Gianni 139.5 + 6.5 = 146  
 Gaston 146 + 13 = 159 points  
 Ivan 139.5 - 6.5 = 133 points  
 Stanislow 133 - 13 = 120 points

E86. Combined work rate is

$$\frac{15 \times 20}{15 + 20} = 8.571 \text{ hours}$$

$$\Rightarrow 8.5714 \times 60 = 8 \text{ hr } 34 \text{ min \& } 17 \text{ seconds}$$

$$\Rightarrow 8:34.17 \times 2 \text{ [for } 120 \text{ m}^2\text{]}$$

$$= 17 \text{ hours } 8 \text{ min \& } 34 \text{ secs}$$

or

Badir's work rate

$$60 \text{ m}^2 \div 15 \text{ hours} = 4 \text{ m}^2 / \text{h}$$

Ornella's work rate

$$60 \text{ m}^2 \div 20 \text{ hours} = 3 \text{ m}^2 / \text{h}$$

$$\text{Total} \Rightarrow 7 \text{ m}^2 / \text{h}$$

Answer

$$120 \text{ m}^2 \div 7 \text{ hours} \Rightarrow$$

$$17 \text{ hours } 8 \text{ min \& } 34 \text{ seconds}$$

E87. "Guess & revise"

Manda 67

Vicki 37

Clea 17



E88a. Nikki  
 3.3 hours x 3mph = 10 miles  
 outside Bath  
 Laura  
 3.3 hours x 6mph = 20 miles  
 outside Salisbury  
 ⇒ Meet at 11.20am

b. Nikki  
 10 hours x 3m = 30 miles  
 Laura  
 10 hours x 6m = 60 miles  
  
 Met in Salisbury at 6pm

E89. 14 possible combinations  
 [10x £1]  
 [8x £1, 1x £2]  
 [6x £1, 2x £2]  
 [6x £1, 1x £4]  
 [4x £1, 3x £2]  
 [2x £1, 4x £2]  
 [2x £1, 2x £4]  
 [2x £1, 1x £8]  
 [5x £2]  
 [3x £2, 1x £4]  
 [1x £2, 2x £4]  
 [1x £2, 1x £8]  
 [1x £4, 1x £2, 4x £1]  
 [1x £4, 2x £2, 2x £1]

E90. 1<sup>st</sup> half x = lemonade  
 y = icy-poles

Therefore, to double numbers in  
 the 2<sup>nd</sup> half sale time Ned sold  
 4x lemonade at half-price sold  
 4y icypoles at half-price

Set-up a 'costs' table

<u>L1<sup>st</sup></u>	<u>P1<sup>st</sup></u>	<u>L2<sup>nd</sup></u>	<u>P2<sup>nd</sup></u>	<u>Cost</u>
10	5	40	20	£18
20	10	80	40	£36

Answer

1<sup>st</sup> half

Lemonade 20 x 50p = £10

Icy-poles 10 x 20p = £2

2<sup>nd</sup> sale half

80 x 25p = £20

40 x 10p = £4

Challenges 91 → 100

These are open-ended questions,  
 with no set solutions. Please refer to  
 introductory sheet 3 for a thorough  
 explanation.