

Answers

Blue



- Decreasing pattern
 $21\text{km} + 18 + 15 + 12$
 $+ 9 + 6 =$
81 km in 6 days
- 3 possible combinations
 - 3 sticks, 4 balls, 4 shin
[\$60 + \$12 + \$28 = \$100]
 - 3 sticks, 11 balls, 1 shin
[\$60 + \$33 + \$7 = \$100]
 - 4 sticks, 2 balls, 2 shin
[\$80 + \$6 + \$14 = \$100]
- Main set
 $0.4 + 0.75 + 0.3 = 1.6\text{km}$
Therefore $1.6 \times 2 =$
3.2 km in total
 $1\text{km} \div 25\text{m} = 40$ laps
 3.2×40 laps = 128 laps
- 150 non-runners
80 missed it with notes
 $150 - 80$ [notes] = 70 walked
150 runners
 $1:5$ sprinted \Rightarrow 30 sprinted
 $150 - 30 = 120$ jogged
- Process of elimination
Mystery number is 46
- “Guess & revise” or algebra
 $x =$ animal [2 legs]
 x [chicken] + $2x$ [sheep] = 42
 $3x = 42$, so $x = 14$ animals
Therefore
7 chickens & 7 sheep
Legs: $14 + 28 = 42$

Maths Challenge Cards

- Set up a costs list
[10 items \rightarrow \$425]

<u>Helmets</u>	<u>Shorts</u>	<u>Total</u>
1	9	\$375
2	8	\$400
3	7	\$425
- $8:00 - 7:00\text{am} = 1$ hour
Breakfast $\frac{1}{3} = 20$ minutes
Left over \Rightarrow 40 minutes
Hair = 15 minutes
Teeth = 5 minutes
Pack bag = 10 minutes
Make lunch = 10 minutes
- Work in reverse
 - $(26 \div 2) - 5 = 8$
 - $((12 \times 2) - 4) \times 2 = 40$
 - $(54 \div 6) - 6 = 3$
- 76 marbles
 $76 \div 5 = 13 \text{ r } 1$
 $76 \div 6 = 12 \text{ r } 4$
 $76 \div 4 = 19$
- “Guess & revise”
Set up a costs table
Answer
 $2 \times \$5$ [4WD] = \$10
 $7 \times \$3$ [sedan] = \$21
- $38 \times 13\frac{1}{2} = 513$ minutes
riding time
 6 breaks $\times 7 = 42$ minutes
Total = 555 minutes
 \Rightarrow 9 hours & 15 minutes
Time finished = 7:15pm

Answers

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Maths Challenge Cards

13. Apples
 $\$7.20 \div 60\text{¢} = 12$ items
 $18 - 12 = 6$ oranges
Oranges
 $\$1.80 \div 6 = 30\text{¢}$ each
14. Ratio is 12 emus : 1 dog
Legs $\Rightarrow 24 + 4 = 28$
 $140 \div 28 = 5$
Therefore, increase 5 fold
60 emus : 5 dogs
Legs = $120 + 20 = 140$
Answer = 5 dogs
15. Arithmetic reasoning
 $\Omega = 1$ $\cup = 6$
 $\text{€} = 2$ $\text{☎} = 7$
 $\Omega = 3$ $\Psi = 8$
 $\infty = 4$ $\infty = 9$
 $\rightarrow = 5$
16. Process of elimination
Mystery number is 424
17. Ratio is 5 red : 4 white
a. $45 \text{ red} \div 5 \text{ red} = 9$ 'sets'
Therefore $4 \times 9 = 36$
 $\Rightarrow 45 \text{ red} : 36 \text{ white}$
b. Pattern has 9 tiles overall
 $225 \div 9 = 25$
Therefore $\times 25$ to both tiles
 $\Rightarrow 125 \text{ red} : 100 \text{ white}$
- 18a. Create/use a calendar
6 joint work days in August:
 $1^{\text{st}}, 7^{\text{th}}, 13^{\text{th}}, 19^{\text{th}}, 25^{\text{th}}, 31^{\text{st}}$
- b. Total days: Dave 16 Matt 11
 $\Rightarrow \$100$ more to Matt [$5 \times \$20$]

19. Work in reverse
a. $(26 - 6) \div 5 = 4$
b. $(\sqrt{16}) + 8 = 12$
c. $((72 \div 6) - 2) \times 2 = 20$
20. Angela 9 & Tim 6
15 items = $\frac{1}{2}$ of total
Nikki = $6 [\text{Tim}] \div 2 \Rightarrow 3$
Rupert 8 & Michael 4
Total $\Rightarrow 30$ items
21. Students to make a list
Answer = $3\text{P} \times 2\text{B} \times 2\text{R} \Rightarrow$
12 different combinations
22. Create "legs" table/list
- | <u>Spiders</u> | <u>Flies</u> | <u>Legs</u> |
|----------------|--------------|-------------|
| 1 [8] | 2 [12] | 20 |
- Want 100 legs = 20×5
 $\Rightarrow 5$ spiders [40 legs]
10 flies [60 legs]
23. "Guess & revise"
- | | |
|----------|----|
| Dad | 36 |
| Mum | 35 |
| Son | 9 |
| Daughter | 7 |
- 24a. $9 \div 3 \times 5 = 15$
b. $2 \times 10 - 7 = 13$
c. $15 \div 3 + 6 = 11$
25. Create a table (add to 19)
- | <u>2 legs</u> | <u>4 legs</u> | <u>Total legs</u> |
|---------------|---------------|-------------------|
| 1 | 18 | 74 (high) |
| 5 | 14 | 66 (high) |
| 10 | 9 | 56 (high) |
| 13 | 6 | 50 |
- Answer
13 two legged & 6 four legged

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26. Until lunch
 $\$176 \div \$4 = 44$
After lunch
 $44 \times 2 = 88$
 $88 \times \$1.75 = \154
Total \Rightarrow
132 soaps for \$330

27.

x	8	5	2	6
4	32	20	8	24
5	40	25	10	30
7	56	35	14	42

28. Students to make a list
Answer = $2 \times 3 \times 3 \times 1$ items
 \Rightarrow 12 combinations of clothing

29. Process of elimination
Mystery number = 63

30. Parents
 $\frac{1}{4}$ each = $\$1250 \times 2 = \2500
 $\Rightarrow \frac{1}{2} = \5000
Friends
 $\$5000 \div 10 = \500 each
Soo kept \$2500
Total winnings \Rightarrow \$10,000

31. Students to list/draw flags
Answer = $3 \times 3 \times 3 \Rightarrow$
27 possible flags

32. $15 + 9 + 25 + 20 + 15 =$
84 books
 $84 \div 6 = 14$ per box

Maths Challenge Cards

33. Last 3 dates
11 / 11 / 2001
11 / 11 / 1999
21 / 11 / 1991
Next 3 dates
11 / 11 / 2010
11 / 01 / 2011
01 / 11 / 2011

34. $32 \div 2 = 16$ matches Round 1
 $16 \div 2 = 8$ matches Round 2
 $8 \div 2 = 4$ matches Round 3
 $4 \div 2 = 2$ matches Round 4
 $2 \div 2 = 1$ match Round 5
Total \Rightarrow 31 matches

35. $8 \times 3 \div 2 = 12$
 $5 \times 6 \div 3 = 8 \Rightarrow 10$

36. 7 people (including herself)
x 6 eggs (1 to each)
= 42 Easter eggs

- 37a.
$$\begin{array}{r} 4\ 1\ 3 \\ 6\ 2\ 4 \\ +\ 2\ 9\ 9 \\ \hline 1\ 3\ 3\ 6 \end{array}$$

- b.
$$\begin{array}{r} 6\ 7\ 2 \\ 4\ 9\ 8 \\ +\ 3\ 4\ 7 \\ \hline 1\ 5\ 1\ 7 \end{array}$$

38. 1 023 456 789
1 023 456 798
1 023 456 879

One billion, twenty-three million, four hundred and fifty-six thousand, seven hundred and eighty-nine.

Answers

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39. Until lunch
 $\$350 \div 5 = 70$ cd's
After lunch
 $70 \times 2 \Rightarrow 140$ cd's
 $140 \times \$3 = \420
Total sales
 $\$350 + \$420 =$
 $\$770$ for 210 cd's
40. 9 queues x 7 people
= 63 ticket buyers
41. Arithmetic reasoning
 $\Phi = 12$
 $\Omega = 3$
 $\oplus = 1$
- $\Phi \Omega \oplus = 16$
- $56 \Rightarrow \Phi \Phi \Phi \Phi \Omega \Omega \oplus \oplus$
42. In 1994
David 24 \rightarrow Peta $24 \div 4 = 6$
"Double" ages
David 36 & Peta 18
Peta born $1994 - 6 = 1988$
Therefore 21st in 2009
43. 'Rest' $\frac{1}{2} \div 4 = \frac{1}{8}$
 $\frac{3}{8}$ used for the 'rest'
 $\frac{1}{8}$ of wood left = 15cm
 $8 \times 15 \Rightarrow 120$ cm originally
44. Previous year
25 boys + 15 girls
New season
 $52 - 40 = 12$
 $\Rightarrow 3$ boys + 9 girls
Overall
28 boys + 24 girls

Maths Challenge Cards

45. Stephanie's expenditure
– \$2600, + \$3000
– \$4000, + \$5200
Overall profit = + \$1600
46. $6 \times 7 \times 8 = 336$
 $336 \times 5 = 1680$
47. Overall handshakes
1st person has 5 handshakes
2nd per. 4 'new' handshakes
[1 is already counted]
3rd per. 3 'new' handshakes
[2 are already counted]
 $\Rightarrow 5 + 4 + 3 + 2 + 1 + 0 = 15$
Answer = 6 guys
48. "Guess & revise" or algebra
 $x =$ cost of top
 $x + (x - 30) + (x + 15) = 150$
 $3x - 15 = 150$
 $3x = 165$, so $x = 55$
Top \$55
Shorts \$25
Shoes \$70
49. Chris 17
[prime number]
Robert 60
[factors 2 3 4 5 6...]
 $60 - 17 = 43$ years
50. Overall
Distance $400 \times 2 = 800$ km
Time $4 \text{ hr} + 1 \text{ hr} = 5$ hrs
- Speed = distance \div time
 $800 \text{ km} \div 5 \text{ hours} =$
160 km/h

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51. Arithmetic reasoning

$$\leftrightarrow = 1 \quad \blacklozenge = 5$$

$$\text{♀} = 2 \quad \blacksquare = 6$$

$$\text{☎} = 3 \quad \text{◎} = 7$$

$$\text{☎} = 4 \quad \text{☺} = 8$$

52. $120 \div 5 = 24$ [median]

$$\Rightarrow 3^{\text{rd}} \text{ hour} = \text{median} = 24$$

$$1^{\text{st}} \text{ hour} = 40$$

$$2^{\text{nd}} \text{ hour} = 32$$

$$3^{\text{rd}} \text{ hour} = 24$$

$$4^{\text{th}} \text{ hour} = 16$$

$$5^{\text{th}} \text{ hour} = 8$$

53a. $46 + 47 + 48 = 141$

b. One hundred and three thousand, seven hundred and seventy-six

54. pp. 1 \rightarrow 9 = 9 digits

pp. 10 \rightarrow 19 = 20 digits

$$9 + (4 \times 20) = 89 \text{ digits}$$

$$\Rightarrow 49 \text{ pages in total}$$

55. "Guess & revise"

Verity was 15 & dad 45

Verity is 30 & dad 60

When $\frac{3}{4}$ ages 9

Verity 90 & dad 120

Unlikely they will be this old together.

56. Pattern

$$1^{\text{st}} \text{ game} = 0 \text{ goals}$$

$$2^{\text{nd}} \text{ game} = 1 \text{ goal}$$

$$3^{\text{rd}} \text{ game} = 2 \text{ goals}$$

$$0 + 1 + 2 + 3 \dots + 14 =$$

$$105 \text{ goals}$$

100 goals in 15th game

Maths Challenge Cards

57. "Guess & revise"

$$2 \times 20\text{¢} = 40\text{¢}$$

$$4 \times 10\text{¢} = 40\text{¢}$$

$$4 \times 5\text{¢} = 20\text{¢}$$

58.

8	1	6
3	5	7
4	9	2

59. 1st half

$$5\text{km} \times 3 = 15\text{km}$$

2nd half

$$5\text{km} \times 2 = 10\text{km}$$

\Rightarrow Jack ran 25km

60. $\$41.60 \div 4 = \10.40

Each item totals \$10.40

$$\Rightarrow \text{muesli } \$5.20 \times 2$$

$$\Rightarrow \text{biscuits } \$2.60 \times 4$$

$$\Rightarrow \text{tinned fruit } 80\text{¢} \times 13$$

$$\Rightarrow \text{Mars bars } \$1.30 \times 8$$

Total = 27 items

61. Beautiful People

$$8 \text{ correct} \times 5 - 2 \text{ wrong} \times 2$$

$$= 36 \text{ points}$$

Magical Wizards

$$7 \text{ correct} \times 5 - 3 \text{ wrong} \times 2$$

$$= 29 \text{ points}$$

62. Work in reverse

Fido \$100

Boys $\$300 \times 3 = \900

Girls $\$600 \times 3 = \1800

Niece/nephew $(\$2700 \times 2) \times 2$

Total \Rightarrow \$13,600

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Maths Challenge Cards

63. Peta 18
 Sasha 12
 Tomi 8

64.

6	7	x	7	6
x	6	5	3	1
2	6	5	x	9
8	1	5	9	x
4	x	5	1	4

65. 4 packs + 3½ lots =
 4 packs + 70 chocolates
 Therefore
 4 packs = 70 chocolates
 ⇒ 1 full pack = 20 chocolate

66. Taking on
 $15 \div 5 = 3$ litres per minute
 Bailing at 2 litres per minute
 Therefore
 Boat takes 1 litre per minute
Answer 1
 In 97th minute add 3 litres
Answer 2
 In 100th minute because
 we don't know the ratio
 of taking on water compared
 to bailing water

67. $6 \times 8 \div 4 = 12$
 $3 \times 8 \div 6 = 4$
 $4 \times 9 \div 2 = 18$

68. Walked
 $\frac{1}{4}$ of 2000 = 500
 Roller-bladed
 $2000 - 500 - 1350 = 150$
 Sprinted
 $150 \times 3 = 450$
 'Remaining group'
 $1350 - 450 = 900$
 Ran hard
 $\frac{1}{2}$ of 900 = 450
 Jogged
 $\frac{1}{3}$ of 900 = 300
 Ran slowly
 $900 - 450 - 300 = 150$

69. Process of elimination
 Mystery number is 71

70. Create a list
 [22 heads → 64 legs]
- | <u>Giraffes</u> | <u>Flamingoes</u> | <u>Legs</u> |
|-----------------|-------------------|-------------|
| 1 | 21 | 46 |
| 2 | 20 | 48 |
| 3 | 19 | 50 |
| 10 | 12 | 64 |
- Answer
 10 giraffes 40 legs
 12 flamingoes 24 legs

71. $189 \div 3 = 63$
 Therefore
 63 boys chose water polo
 126 boys chose basketball

72. Work in reverse
 a. $((20 + 16) \div 2) \div 2 = 9$
 b. $((12 \times 3) - 16) \times 5 = 100$
 c. $((2 \times 4) \times 2) \times 8 = 128$

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73. Sept = $19^{\circ}\text{C} \times 30 = 570^{\circ}\text{C}$
Oct = $22^{\circ}\text{C} \times 31 = 682^{\circ}\text{C}$
Nov = $25^{\circ}\text{C} \times 30 = 750^{\circ}\text{C}$
Total temperatures = 2002°C
Therefore, Yes.
74. Rule
top number $\div 6$ then $+ 4$
Work in reverse
 $(16 - 4) \times 6 = 72$
Apply rule
 $12 \div 6 + 4 = 6$
Work in reverse
 $(14 - 4) \times 6 = 60$
75. 60 swap cards
 $60 \div 5 = 12$
Therefore
48 horse & 12 dog
Probability
 $\frac{1}{4}$ of 48 = 12 gold horse cards
76. "Guess & revise"
 $50 \text{ dogs} \times \$10 = \500
 $40 \text{ cats} \times \$5 = \200
 $90 \text{ birds} \times \$2 = \$180$
Total is 180 animals for \$880
77. "Guess & revise"
Steve 42
Jenny 36
Jilly 12
Sam 10

Maths Challenge Cards

78.

–	30	14	23	17
9	21	5	14	8
14	16	0	9	3
3	27	11	20	14

79. $550 \div 4 = 137.5$ median
15 point margins
 $15 \div 2 = 7.5$
Above median
Darcy $137.5 + 7.5 = 145$
Claire $145 + 15 = 160$
Below median
Madeleine $137.5 - 7.5 = 130$
Jean $130 - 15 = 115$
80. "Guess & revise"
Set up a costs table
Answer
 $4 \text{ old} \times \$40 = \160
 $3 \text{ new} \times \$50 = \150
 $\Rightarrow 7 \text{ games for } \310

Answers

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81. Example years
111, 181, 808, 818
1001, 1111, 1881
82. $2 \pi r = c$
 $2 \times \pi \times 15\text{cm} = 94.25\text{cm}$
 $94.24 \times 240 \text{ rotations}$
 $= 226.2 \text{ metres}$
83. Colour choices
Quadrant 1 \rightarrow 4
Quadrant 2 \rightarrow 3
Quadrant 3 \rightarrow 2
Quadrant 4 \rightarrow 1
 $4 \times 3 \times 2 \times 1 \Rightarrow 24$
combinations of flags
- Unfortunately, if you don't assume that there are only four colours to choose between, then the possibilities are infinite.
84. A = 3, 6 or 9
B = 2, 4 or 6
C = 1, 2 or 3
85. "Guess & revise" or algebra
Let golf balls cost x dollars
 $4x + 2x = \$36$
 $\Rightarrow x = \$6$
Therefore
Golf balls $4x \Rightarrow \$24$
 $\$24 \div 50\text{¢} = 48 \text{ golf balls}$
Tennis balls $[2x] \Rightarrow \$12$
 $\$12 \div \$1 = 12 \text{ tennis balls}$
Total
60 balls for \$36

Maths Challenge Cards

86. Process of elimination
Mystery number = 31872
87. $120 \text{ min} \div 10 \text{ min} = 12 \text{ buses}$
12 buses, because they will pass all buses departing within their two hour travelling time.
88. Working out combinations
 $2 \times 5 \times 2 = 20 \text{ routes}$
1st fence = 2 holes
2nd fence = 5 holes
3rd fence = 2 holes
89. Arithmetic reasoning
 $10 \times 10 = 100$
 $\infty = 0$
 $\text{£} = 1$
 $\Omega = 2$
 $\otimes = 4$
 $\# = 5$
- 90a. $157 + 163 + 167 = 487$
b. $16 \times 17 \times 18 = 4896$

Challenges 91 \rightarrow 100

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