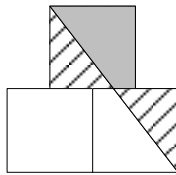


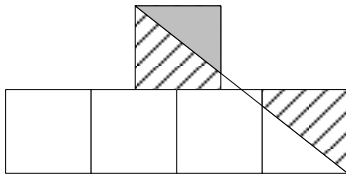
Answer Key

- D
- B
- 12394
- $12 + 8 + 6 = 26$
- Draw on the well-known triples:
 $30:24:18 = 5:4:3$
 $25:24:7$
 Perimeter
 $= 30 + 2 \times 50 + 25 + 18 + 7$
 $= 180$

- $1 \otimes 2 = \frac{1}{2}$
 $\frac{1}{2} \otimes 3 = \frac{1}{12}$
 $1 \otimes (2 \otimes 3) = 1 \otimes \frac{4}{3} = \frac{3}{4}$
 $\frac{1}{12} - \frac{3}{4} = -\frac{8}{12} = -\frac{2}{3} = -2/3$
- 1
- 1



- 1



- $35 \div 5 = 7$
 $35 = 10 + 25$
 $7 - 2 = 5$
- For simplification, let's divide these numbers by 13, so that we have 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13. Replace these 4 even numbers, by 15, 17, 19, 21
 $13 \times 21 = 273$

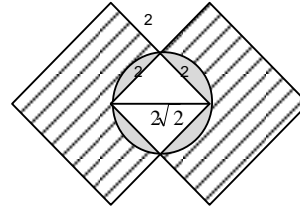
- area of $AECF = \frac{1}{2}(72) = 36$
 area of $\triangle CEF = \frac{1}{8}(72) = 9$
 $36 - 9 = 27$

- A
 $2 \times \frac{3}{4} \times 16 = 24$
 area of the shaded region =
 $2\pi - 4$
 The circle has a radius of $\sqrt{2}$.

So, the area of the shaded region in the circle is $2\pi - 4$

$$2 \times \frac{3}{4} (\text{square area}) = 1.5 \times 16 = 24$$

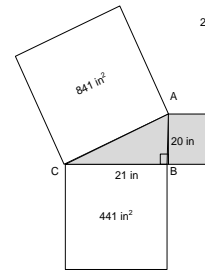
$$\begin{aligned} \text{area of the striped region} &= \\ &= 24 - (2\pi - 4) \\ &= 28 - 2\pi \end{aligned}$$



- $3f = 2l$
 $l = 4b$
 $3f = 8b$
 $f = \frac{2}{3}b$

1	1	1
4	13, 22, 31	3
9	9, 18, ..., 81, 90	10
16	79, 88, 97	3
Total		17

- Ans = 17 such numbers
- The next palindrome year is 2112. So,
 $2 \times 1 \times 1 \times 2 = 4$
- $100 \div 2 = 50$
 There are 4 different rectangles:
 $3 + 47 = 7 + 43 = 13 + 37 = 19 + 31$
 Ans = 4
- $841 - 441 = 400$
 $\frac{1}{2} \sqrt{441} \times \sqrt{400} = 210$
 $400 + 210 = 610$



- $2(1 - \frac{1}{2}) + 3(1 - \frac{1}{3}) + 4(1 - \frac{1}{4}) + \dots + 10(1 - \frac{1}{10})$
 $= 2 - 1 + 3 - 1 + 4 - 1 + \dots - 10 - 1$
 $= 2 + 3 + 4 + \dots + 10 - 9$
 $= 1 + 2 + 3 + \dots + 10 - 10$
 $= 55 - 10 = 45$

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20. 1 chopped, then 5 grow, or 4 added
6 chopped, then 30 grow, or 24 added.
 $5 + 30 - 6 = 29$
21. Method I)
area of $\triangle AECF = \frac{1}{6}(72) = 12$
area of $\triangle ADF = \frac{3}{8}(72) = 27$
area of $\triangle CEF = \frac{1}{2} \times \frac{1}{4} \times \frac{2}{3}(72) = 6$
area of $\triangle AEF = 72 - (12 + 27 + 6) = 27$
- Method II)
 $\frac{1}{2} \det \begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix} = 4.5$ ($\triangle AEF$)
 $\det \begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix} = 12$ (rectangle ABCD)
 $\frac{4.5}{12} \times 72 = 27$
22. $4 \times 4 + 2 \times 5 + 2 \times 3 + 2 \times 1 = 16 + 10 + 6 + 2 = 34$
23. $5 + 3 \times 4 \times 4 + 3 \times 6 = 5 + 48 + 18 = 71$
24. $4 \times 4 \times 5 = 80$
25. $5 \times 5 \times 5 - (3 \times 5 - 2) = 125 - 13 = 112$
26. 86
27. $6 + 2 \times 5 + 2 = 18$
28. $4 \times (1 + 2 + 3 + 4 + 5) + 6 = 66$
29. $4 \times 6 = 24$
7
 $8 \times 18 = 144$
 $4 + 6 + 7 + 8 + 18 = 43$
30. $16 + 25 + 34 + 43 + 52 + 61 + 70 = 301$
31. 5
32. $2 \times (5 + 2) \times 2 + 2 = 30$
33. The area of EFGH
 $= 80 - 42$
 $= 38$
 $= FG \times d$
 $FG = 5$
 $d = 7.6$
34. $2 \times (2 + 3 + 3 + 4) = 24$ m

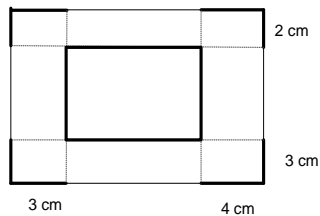
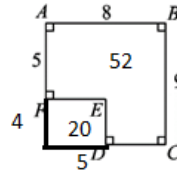
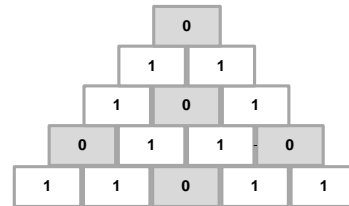


Figure not drawn to scale.

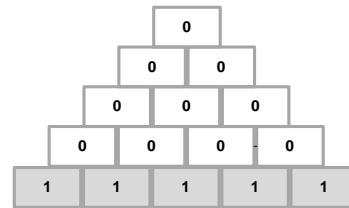
35. $4 + 5 = 9$



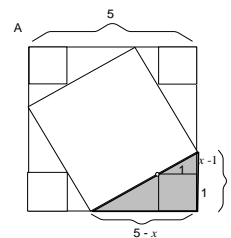
36. 10 boxes at most
to be filled with odd numbers.
0:even
1:odd



Similarly, there are also 10 boxes to be filled with even numbers.



37. C
Use the figure below:
 $\frac{x-1}{1} = \frac{x}{5-x}$
 $(x-1)(5-x) = x$
 $x(5-x) = 5$
The area of the shaded corner triangle = 2.5.
Four of them: $4 \times 2.5 = 10$
 $5^2 - 10 = 15$



38. Remember: \$49.5 is not needed.
 $1 + 0.6 + 0.5 = 2.1$ (with discount)
 $1 + 1 + 1 = 3$ (regular price)
 $3 - 2.1 = 0.9$ (saving)
 $0.9 \div 3 = 0.3 = 30\%$
39. 2 drivers
 $2 \times (3 \times 2 \times 1) = 12$
40. N is a 3-multiple
M is a 4-multiple

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$N > 2M$
 $N > 50$ (critical observation)
 $N = 60, M = 16$

N	M
36	40
48	28
60	16
72	4

41. B
42. $-8 \times 5 \times 7 = -280$
43. C
 10 sec for 6 cars
 5 sec for 3 cars
 $2 \text{ min } 45 \text{ sec} \div 5 \text{ sec} = 24 + 9 = 33$
 $33 \times 3 = 99$
44. $160 - 40 = 120$
 $\frac{3}{4}(120) = 90$
 $90 + 40 = 130$
45. 4, 6, 12, -2, 9
 $\frac{1}{2}(4 + 9) = 6.5$
46. Let assume
 M: 8 sec for one round
 L: 9 sec for one round
 After 72 sec, M makes 9 rounds, while L makes 8 rounds. So, they will cross each other after 72 sec for the first time if they start off the same position. Now that they are $\frac{1}{2}$ round apart, it will take 36 sec to cross each other. Also, 36 sec allow L to make 4 rounds.
 $36 \div 9 = 4$ rounds
47. In 2 weeks, Jack has 4 lessons and Hannah has 1 lesson.
 $4 - 1 = 3$
 $15 \div 3 = 5$
 $5 \times 2 = 10$
48. 2
- $$\begin{array}{r} \\ + \\ \hline 1 \end{array}$$
- $$\begin{array}{r} \\ + \\ \hline 1 \end{array}$$
- $$\begin{array}{r} \\ + \\ \hline 1 \end{array}$$
49. D
 $2015 \div 700 \text{ R } 615$
 $2015 \div 701 \text{ R } 613$
 $2015 \div 707 \text{ R } 601$

$2015 \div 699 \text{ R } 617$
 $2015 \div 698 \text{ R } 619$
 ...
 $699 - n > 617 + 2n$
 $82 > 3n, n = 27$
 $699 - 27 = 672$
 $707 - 672 + 1 = 36$

50. B
51. D
 $\frac{3}{8} - \frac{1}{4} = \frac{1}{8}$
 $\frac{1}{4} - \frac{5}{16} = \frac{1}{16}$
 $\frac{9}{32} - \frac{1}{4} = \frac{1}{32}$
 $\frac{17}{64} - \frac{1}{4} = \frac{1}{64}$
52. A
 The minimum edges of a shape is 3. The total number of edges cannot be smaller than $3 \times 3 = 9$.
53. C
 They are all multiples of 11. See the following examples.
 $13 + 31 = 44$
 $26 + 62 = 88$
 $47 + 74 = 121$
 $54 + 45 = 99$
 $68 + 86 = 154$
54. -1
55. $\frac{75}{120} = \frac{5}{8} = 0.625 = 62.50\%$
56. The number of children = number of different combinations of two different flavors.

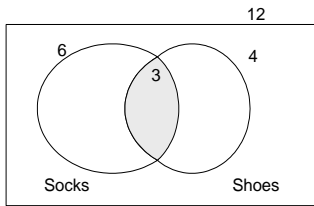
	1	2	3	4	5	6	7	8	9
1									
2									
3									
4									
5									
6									
7									
8									
9									

- $8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 36$ children
57. $11^2 = 121$
 $31^2 = 961$
 $32^2 = 1024$
58. A = 1
 B = 5
 C = 3
 D = 7
 $1535 \times 5 = 7675$
 $C + D = 3 + 7 = 10$



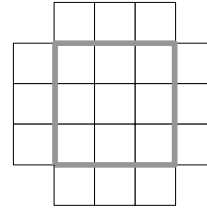
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59. $6 + 4 - 3 = 7$ (either)
 $12 - 7 = 5$ people in bare feet!



60. $2 \times 4 \times 6 \times 8 \times 10 = 256 \times 15$
 $1 \times 2 \times 3 \times 4 \times \dots \times 10$ is divisible by 256, thus remainder is 0.
 Ans = 0
61. Let x be the ones digit, the tens digit is $x+2$, and the hundreds digit is $x+3$. Since the sum of the tens and hundreds digits is $x+2+x+3 = 2x+5$, which is three times the ones digit, so we have $2x+5 = 3x$
 $\Rightarrow x = 5$
 Ans = 875

62. There are 21 one-by-one's.
 There are $4 + 2 \times 4 = 12$ two-by-two's
 There are $1 + 1 \times 4 = 5$ three-by-three's
 Ans = 38 squares in total



63. B
 $9 \times 10^5 \times 5 = 4,500,000$
64. B
 They are 5 min apart every 2 hours.
 To be 60 min ahead, it takes
 $60 \div 5 \times 2 = 24$ hours.
65. $372 - 307 = 65$ (miles per hour)
 $242 - 3 \times 65 = 242 - 195 = 47$ mi left