



A collage of various analytical chemistry and data visualization elements. It includes a lightbulb with a brain-like filament, a 3D pie chart, a flowchart with arrows, laboratory glassware like test tubes and flasks, and a smartphone displaying data. The background features a dark area with floating black circles and diamonds.

EPEA516 ANALYTICAL SKILLS II

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Learning Outcomes



After this lecture, you will be able to

- develop understanding about the basics of insert the missing character,
- analyze different types of insert the missing character,
- solve various problems relating to insert the missing character.

Insert The Missing Character

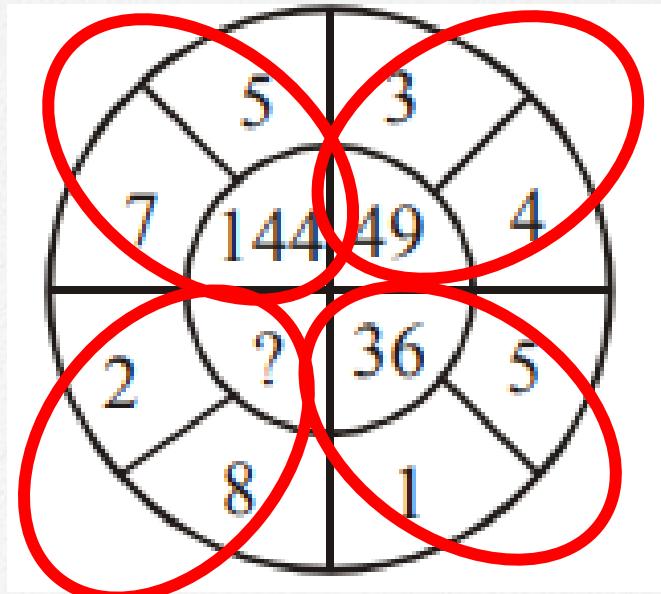
- Figure/Set of Figures/Arrangement/Matrix
- Certain Characteristics
 - Numbers/Letters/Group
 - Combination of Letters/Numbers
- Missing Character

Insert The Missing Character

- Set of Figures
- Set of Arrangements
- Set of Matrix

Problem

- What number should replace the question mark?
 - (a) 64
 - (b) 68
 - (c) 82
 - (d) 100
- Explanation:
- Required number = $(2 + 8)^2 = 100$



Problem

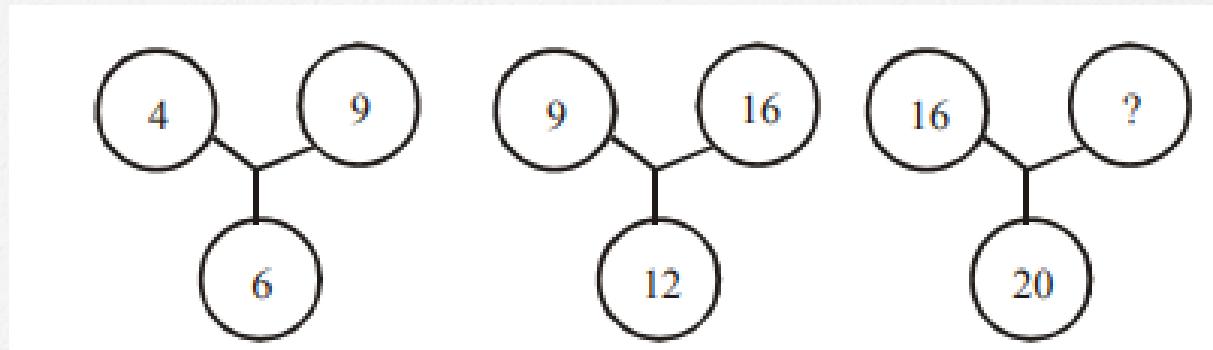
- What number should replace the question mark?

- (a) 25

- (b) 40

- (c) 50

- (d) 60



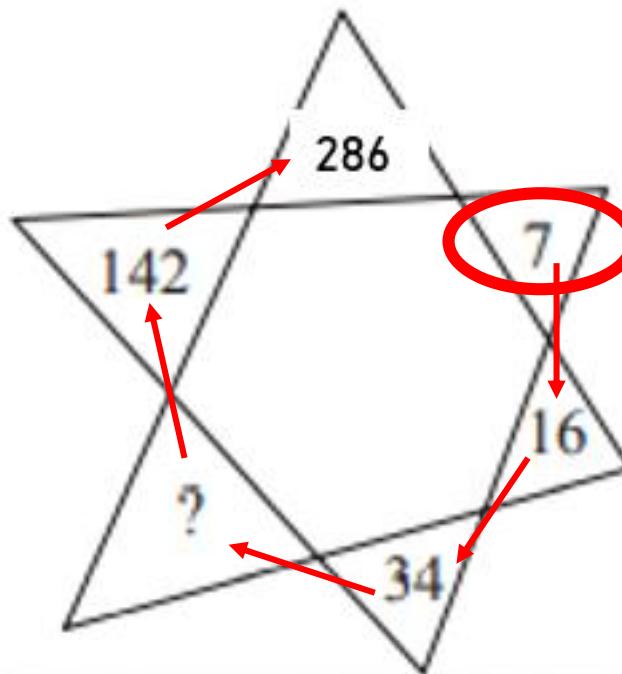
- Explanation: $\sqrt{4 \times 9} = \sqrt{36} = 6$

- $\sqrt{9 \times 16} = \sqrt{144} = 12$

- $\sqrt{16 \times x} = \sqrt{16x} = 20$ or ~~$16x = 400$~~ or $x = 25$

Problem

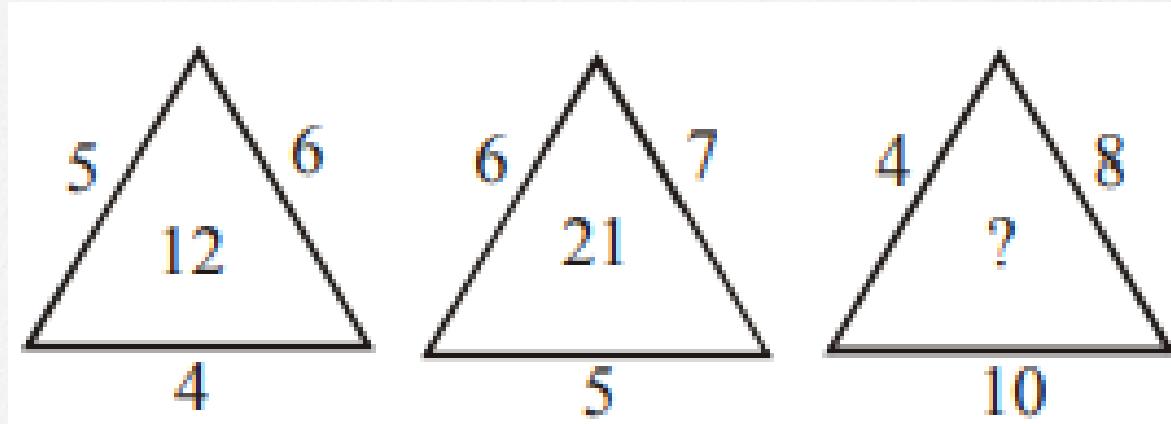
- What number should replace the question mark?
- (a) 66
- (b) 68
- (c) 70
- (d) 72
- Explanation:
- Starting with 7, Double the number and add 2.



Problem

- What number should replace the question mark?

- (a) 320
- (b) 32
- (c) 22
- (d) 14

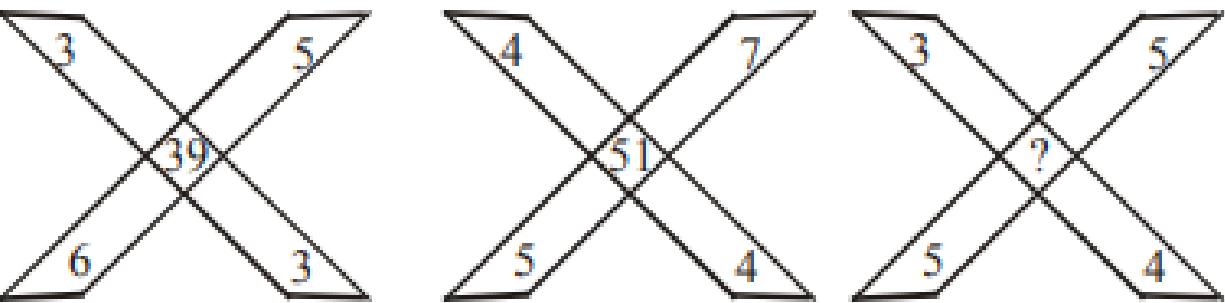


- Explanation: $(\frac{5 \times 6 \times 4}{10}) = (\frac{120}{10}) = 12$; $(\frac{6 \times 7 \times 5}{10}) = (\frac{210}{10}) = 21$
- $(\frac{4 \times 8 \times 10}{10}) = (\frac{320}{10}) = 32$

Problem

- What number should replace the question mark?

- (a) 45
- (b) 47
- (c) 35
- (d) 37



- Explanation:

- $3 \times 3 + 6 \times 5 = 39$ and $4 \times 4 + 5 \times 7 = 51$

- $3 \times 4 + 5 \times 5 = 37$

Problem

- What number should replace the question mark?

- (a) 9

- (b) 8

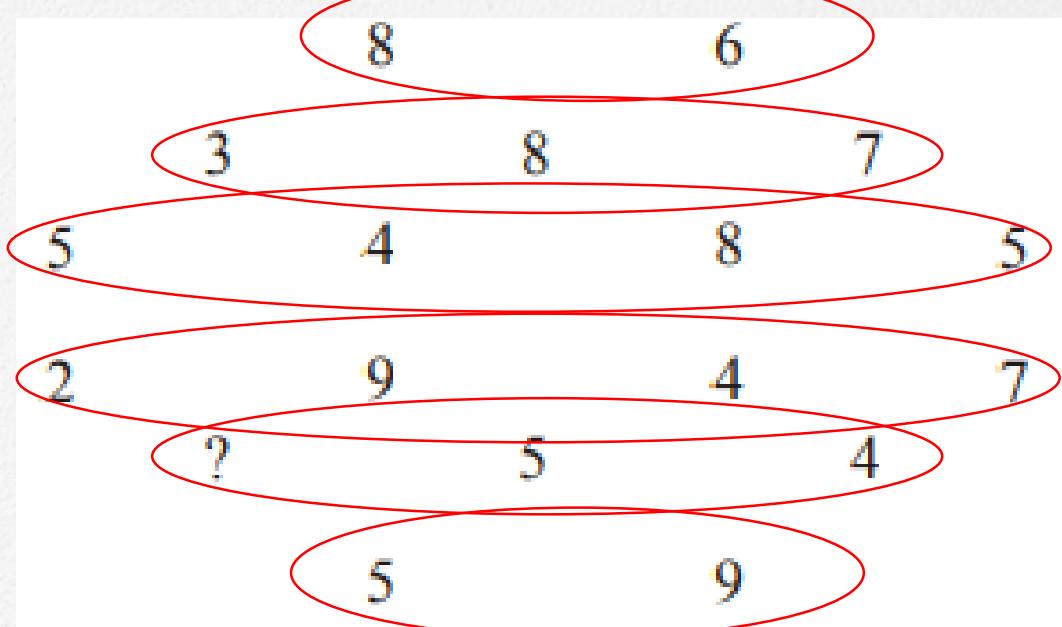
- (c) 7

- (d) 6

- Explanation:

- Total of rows having two & four numbers = 14 & 22

- Total of rows having three numbers = 18



Problem

- What number should replace the question mark?

- (a) 42
- (b) 32
- (c) 46
- (d) 45

A 3x4 grid puzzle. The numbers in the grid are:

17	26	21	30
38	29	34	25
33	42	37	?

Red arrows indicate the following sequence pattern:

- Row 1: 17 → 26 → 21 → 30
- Row 2: 38 ← 29 ← 34 ← 25
- Row 3: 33 → 42 → 37 → ?

Large black arrows point from the first and last cells of each row to the left and right respectively, highlighting the sequence flow.

- Explanation:
- Beginning at 17, +9 and -5.

Problem

- What number should replace the question mark?
- $4322 : 48$
- $4172 : 56$
- $7615 : ?$
- (a) 49 (b) 52 (c) 210 (d) 336
- Explanation: $4 \times 3 \times 2 \times 2 = 48$; $4 \times 1 \times 7 \times 2 = 56$
- $7 \times 6 \times 1 \times 5 = 210$

Problem

- What number should replace the question mark?

(a) 144

(b) 120

(c) 100

(d) 96

11	3	49
5	19	?
7	13	100

• Explanation - $\left(\frac{11+3}{2}\right)^2 = (7)^2 = 49$, $\left(\frac{7+13}{2}\right)^2 = (10)^2 = 100$

• $\left(\frac{5+19}{2}\right)^2 = (12)^2 = 144$

Problem

- What number should replace the question mark?

- (a) 11 E (b) 28 G

- (c) 35 I (d) 48 F

- Explanation

- Number is the product of the two numbers.

- 1st row-letters are consecutive (**CDE**).

- 2nd row, letters are +1 (**IJKLM**).

- 3rd row, the letters are + 2 forward (**DEFGHIJ**).

- $4 \times 7 = 28$ and G.

3C	24D	8E
7I	21K	3M
4D	?	7J

Problem

- What number should replace the question mark?

- (a) 86 (b) 98
- (c) 68 (d) 43

- Explanation

- $(8 \times 9) - 3 = 69$

- $(7 \times 5) - 6 = 29$

- $(4 \times 7) - 9 = 19$

- $(9 \times 8) - 4 = 68$

8	9	3	69
7	5	6	29
4	7	9	19
9	8	4	?

Problem

- What number should replace the question mark?
- (a) 4
- (b) 1
- (c) -1
- (d) -2

0	-1	-2
1	0	-1
2	?	0

Problem

- What number should replace the question mark?

- (a) 80
- (b) 70
- (c) 60

(a) 50

5	9	7
4	5	3
1	6	8
40	100	?

- Explanation: $(5)^2 + (4)^2 - 1 = 25 + 16 - 1 = 41 - 1 = 40$
- $(9)^2 + (5)^2 - 6 = 81 + 25 - 6 = 106 - 6 = 100$
- $(7)^2 + (3)^2 - 8 = 49 + 9 - 8 = 58 - 8 = 50$

Conclusion

- Insert The Missing Character
 - Figure/Set of Figures/Arrangement/Matrix
 - Certain Characteristics
 - Missing Character

Summary

- Insert The Missing Character
 - Set of Figures
 - Set of Arrangements
 - Set of Matrix

That's all for now...