



National Analytical Brains Competition 2023

NAB Competition 2023- Grade 08 & Above

Mathematical Ability

All questions are mandatory. Please note there is no negative marking:

1. Find the least number by which 288 must be multiplied so that it becomes a perfect square?

- 3
- 2
- 4
- 1

2. A ramp to a newly constructed hospital must be built according to the building by laws stated in the municipal corporation. If the ramp is 25 feet long and the top of the ramp is 7 feet off the ground, how far is the bottom of the ramp from the base of the building?

- 25 feet
- 32 feet
- 18 feet
- 24 feet



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3. Find the breadth of a rectangle if square and rectangle are made by same length of wire and side of the square is 12 cm and length of the rectangle is 18 cm.

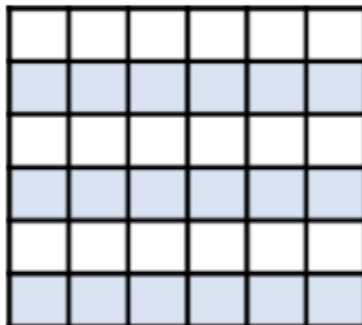
- 2 cm
- 9 cm
- 4 cm
- 6 cm

4.

The model below represents

$$\sqrt{36} = 6$$

Which arrangement of small squares can be used to model a large square that represents $\sqrt{324}$?



- 9 rows of 36 square
- 18 rows of 18 squares
- 12 rows of 27 squares
- 6 rows of 54 squares

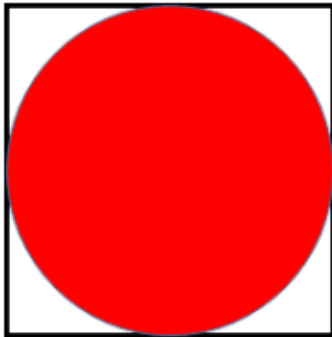


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5. What percent is 54 minutes of 2 hours?

- 27%
- 45%
- 108%
- 54%

6. If the radius of the circle below is four centimeters, what is the area of the unshaded region? (Use $\pi = 3.14$)



- 50.24 sq. cm
- 9.72 sq. cm
- 13.76 sq. cm
- 16 sq. cm

7.

Find X and Y if $(X)^Y = 529$ such that $X > Y$, Where X and Y are positive integers.

- 22,2
- 23,2
- 21,2
- Other:



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8. A mall manager is planning to buy a trampoline. She can choose a square or circular model. The perimeter of the square trampoline is 44 feet and the circumference of the circular model is also about 44 feet. She wants to buy the trampoline with the greater area so the children will have plenty of room to jump and turn. Which model should she buy?

- Square Model
- Circular Model
- Anyone, as both will have same area

9. How many positive integers are less than 1000 that are divisible by 2, 3, 5, and 7.

- 11
- 4
- 7
- 6

10. Two cubes have their volume in the ratio of 1:8. If the volume of smaller cube is 125 cubic cm. Find the side of smaller cube?

- 20 cm
- 5 cm
- 15 cm
- 10 cm



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11. Out of ₹950. I saved 20%. Find my spending.

- ₹760
- ₹190
- ₹740
- ₹260

12. 89 persons are going for rafting trip They can rent 5-person, 7-person, and 8-person rafts. All the rafts must be full in order to have the correct balance. The daily rental rates are:

5-person raft ₹240.00

7-person raft ₹280.00

8-person raft ₹340.00

What can be the minimum possible total cost of rafting?

- ₹3600
- ₹3300
- ₹5200
- ₹3040

13. By selling a chair for ₹ 990. Mohan loses 10%. Find the cost price of the chair?

- ₹1000
- ₹1200
- ₹990
- ₹1100



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14. The radius of a tennis ball is y centimeters. If a container holds four balls, express its height in terms of y .

- $2y$
- $8y$
- $4y$
- $y/2$

15. Dolo 500 mg has a half-life of two hours. This means that every two hours, half of the amount of the medicine is available in the bloodstream. The Dolo is effective only when more than 100 mg is in the bloodstream. If the first dose is given at 8:00 a.m., when should the next dose be given?

- Few minutes after 10:00 a.m.
- Few minutes after 12:00 noon.
- Few minutes after 2:00 p.m.
- Few minutes before 10:00 a.m.

16. The height of a cylinder is 14 cm and its radius is 7 cm. Find the total surface area of the cylinder?

- 922 sq cm
- 920 sq cm
- 926 sq cm
- 924 sq cm



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17. The steps Aarna took to evaluate the expression $4y + 4 \div 4$ when $y = 7$ are shown below. What should Aarna have done differently in order to evaluate the expression correctly?

$$\begin{aligned}4y + 4 \div 4 \text{ when } y = 7 \\4 \times 7 = 28 \\28 + 4 = 32 \\32 \div 4 = 8\end{aligned}$$

- divided $(28+4)$ by (28×4)
- divided $(28+4)$ by $(28+4)$
- added $(4 \div 4)$ to 28
- added 4 to $(28 \div 4)$

18. A wall in a room is 15 feet long. On a scale drawing it is shown as 6 inches. What is the scale of the drawing?

- 1 inch = 2.5 feet
- 1 feet = 2.5 inch
- 90 inch = 1 feet
- 1 inch = $6/15$ feet

19. In an off season sale, a shopkeeper is giving successive discounts 20% and 20% on every item. Find the single discount equivalent to these successive discounts.

- 40%
- 42%
- 58%
- 36%

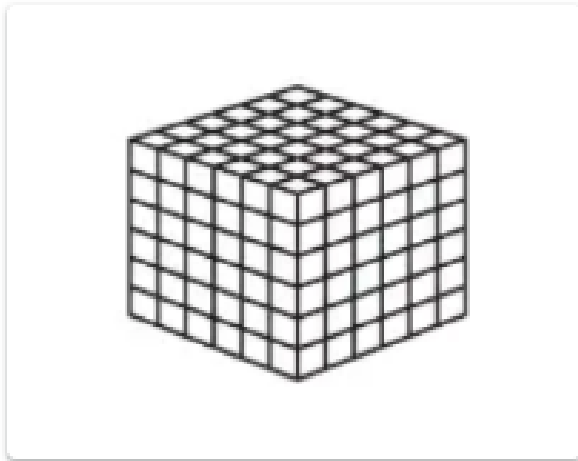


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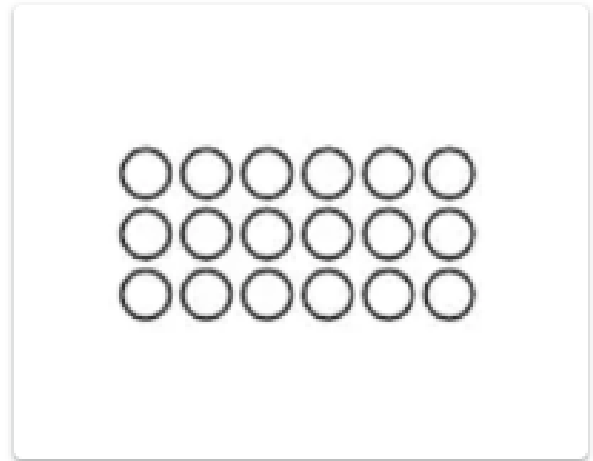
20.

Which model represents :

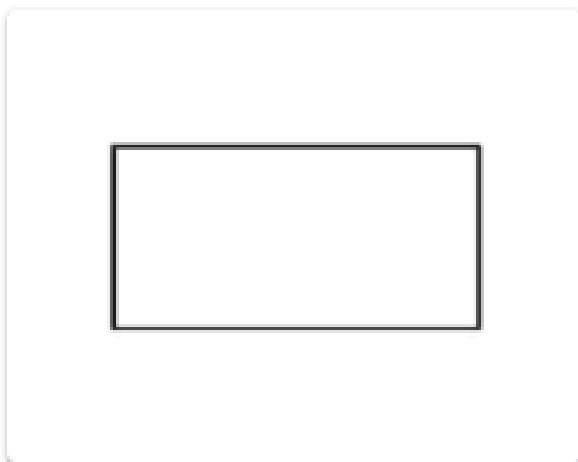
$$6^3$$



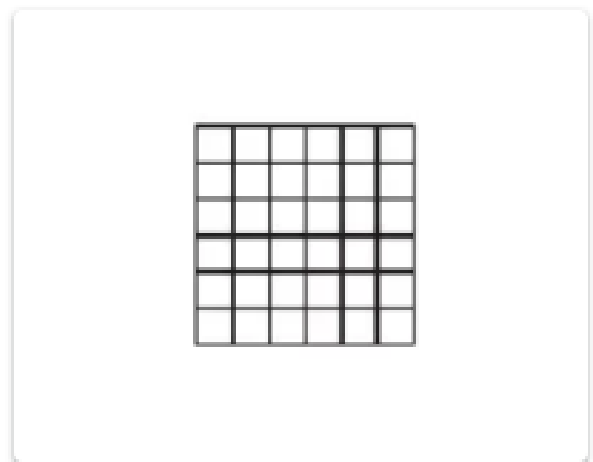
Option 1



Option 2



Option 3



Option 4



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Logical Reasoning Ability

All questions are mandatory. Please note there is no negative marking:

Q 21: Find the figure which is breaking the rule?



- C
- D
- F
- G
- B

Q 22: In the below series, what will come in place of "?".

45, 54, 47, ?, 49, 56, 51, 57, 53

- 48
- 50
- 55
- None of these



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Q 23: There is certain relation between two words on either side of :: Find the best suited missing word.

Forecast : Future:: Regret : ?

- Present
- Past
- Sins
- Atone

Q 24: In a class of 33 students , all but 11 students failed in the exam. How many students passed the exam?

- 11
- 22
- 33
- No one

Q 25: Which letter is seventh to the right of the thirteenth letter from the left end in below series.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

- S
- T
- U
- V
- None of these



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Q26: Find out the logic between the numbers and then decide what should come in place of "?".

7	10	22
5	4	8
6	7	?

- 15
- 13
- 10
- 9
- None of these

Q 27: Manit has 14th rank from the top in a row of 40 participants. What is his rank from the bottom?

- 24th
- 25th
- 27th
- None of these

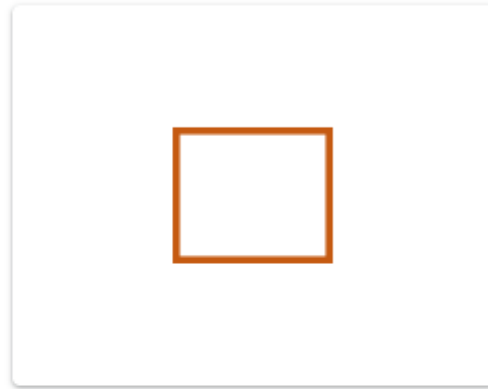


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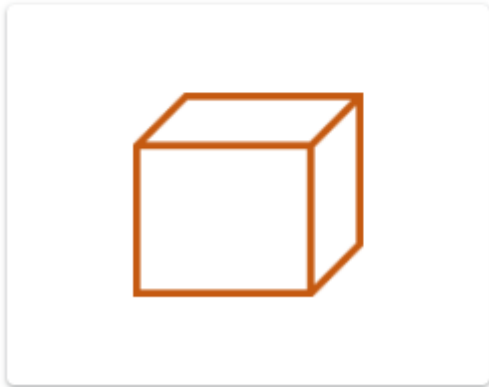
Q 28: Which option will come next in the below pattern?



Option 1



Option 2



Option 3



Option 4



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Q 29: If every 2nd & 4th Saturday and all Sundays are holidays in your school. Then in the month of June for how many days you will attend the school if 1st June is Saturday?

- 20
- 21
- 22
- 23

Q 30: In a certain code , CALANDER is written as CLANAEDR. How is CIRCULAR written in that code?

- ICCRLURA
- CRIUCLRA
- CRICUALR
- CRIUCALR

Q 31: If **A** is the brother of the son of **B**'s son, how is **A** relates to **B**?

- Son
- Grandson
- Brother
- Cousin
- Uncle



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Q 32: Bread is related to wheat in the same way as brick is related to ___?__

- Clay
- Stone
- Cement
- Building

Q 33: Out of the below five items, four have something common between them and the fifth one is different. Find that odd one out.

- Tomato
- Potato
- Ginger
- Turmeric
- Carrot

Q 34: Two positions of the same dice are given, which of the following number will be opposite to 1?

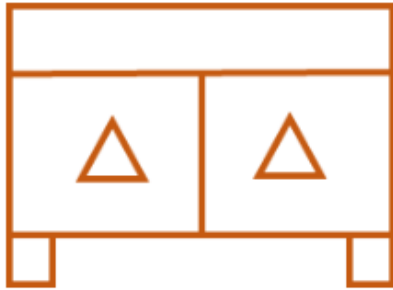


- 6
- 5
- 1
- 3



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Q 35: How many vertical Lines are there in the below picture?



- 7
- 6
- 5
- 4

Q 36: From amongst the options, select the one which satisfies the same conditions of placement of the dot(s) as in the below figure?



Option 1



Option 2



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Option 3



Option 4

Q 37: In a certain code , DESK is written as #52, RIDE is written as %7#\$.
How you will write RISK in this code?

- %752
- %725
- %7#2
- %7\$#

Q 38: Aadvik went 5 kms to the west from house, then turned left and walked 10 kms. He then turned east and walked 12 kms and finally turned left and covered 10 kms. How far he is from his house?

- 15 kms
- 12 kms
- 7 kms
- 37 kms



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Q 39: Which word will come at 2nd last position if arranged in alphabetical order as in dictionary?

- Savour
- Save
- Savage
- Sausage
- Saviour

Q 40: If A stands for +, B stands for -, C stands for multiplication, then what is the value of :
(10C4)A(4C4)B6?

- 60
- 56
- 50
- 46
- None of These



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Real Life Problems

Read the following information and answer the questions from 41 to 45:

A family consists of six members **A, B, C, D, E** and **F**. There are two married couples. **B** is a doctor and the father of **E**. **F** is grandfather of **C** and is a contractor. **D** is grandmother of **E** and is a housewife. There is one doctor, one contractor, one nurse, one housewife and two students in the family.

Q 41: Who is the husband of **A**?

- B
- C
- D
- E
- F

Q 42: Who is the sister of **E**?

- A
- B
- C
- D
- F



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Q 43: What is the profession of A ?

- Doctor
- Nurse
- Doctor or Nurse
- Housewife
- None of these

Q 44: Which of the following are two married couples?

- DF, BE
- DF, BA
- DE, CF
- DF, AC
- None of these

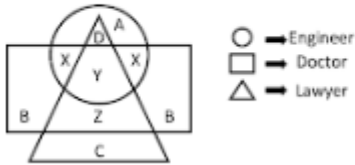
Q 45: Which of the following is definitely a group of male members?

- BF
- BFE
- BFA
- EF
- None of these



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Based on the info displayed in the figure answer the questions from 46 to 50:



Q46: Which portion represents the persons who are Engineer as well as Lawyers?

- A
- B
- C
- D

Q 47: Which one represent the Lawyers, who are doctors but not engineers?

- B
- C
- X
- Z

Q 48: C represents:

- Engineers
- Lawyers
- Doctors
- Lawyers and Doctors



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Q 49. B represents:

- Engineers who are neither lawyers nor doctors
- Engineers who are not lawyers
- Doctors who are neither lawyers nor engineers
- Engineers who are not doctors

Q 50: Engineers who are also Doctors are represented by:

- A
- X
- Y
- Z