

Level D - Form 1 - Applied Mathematics: Patterns, Functions, Algebra

Sample Question

What number goes in the box to make this number sentence true?

$$15 \div \square = 5$$

- A 1
- B 2
- C 3
- D 4

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1. What number goes in the box to make this number sentence true?

$$9 \times 3 \times \square = 81$$

- A 27
 - B 54
 - C 13
 - D 3
2. If you start with 9, then add 2, and then keep adding 2 to the number you get each time, you will **never** get the number
- F 11
 - G 30
 - H 43
 - J 47

3. What number is missing from this number sequence?

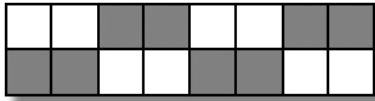
$$1, 4, 2, 5, \underline{\quad}, 6$$

- A 5
 - B 4
 - C 3
 - D 2
4. Which group of numbers is missing from this number sequence?

$$8, 14, 20, 26, \underline{\quad}, \underline{\quad}, \underline{\quad}, 50$$

- F 30, 34, 38
- G 32, 38, 44
- H 33, 40, 47
- J 34, 41, 48

The illustration shows two rows of the tiled floor that Miguel is putting in his entryway. Use the information to do Numbers 5 through 6.



5. Altogether there will be 15 rows of tile on the floor. Rows 3 through 15 will follow the same pattern as the first two rows. In which number sentence is n the number of white tiles that Miguel will need to tile the entire floor?

A $4 \times 15 = n$

B $4 \times 13 = n$

C $\frac{n}{13} = 4$

D $n = 15 \times 8$

6. Altogether there will be 15 rows of tile in the floor. It takes Miguel 30 minutes to install the first two rows of tile. At the same rate, how long will it take to install the rest of the tiles?

F $7\frac{1}{2}$ hours

G $3\frac{1}{4}$ hours

H $3\frac{3}{4}$ hours

J $6\frac{1}{2}$ hours

7. In which of these equations is n equal to 6?

A $2 \times 4 = n$

B $12 + n = 20$

C $n + 4 = 10$

D $2n = 16$

8. This table shows input numbers that have been changed to output numbers by applying a specific rule.

Input	Output
3	5
12	23
15	29
24	?

What number is missing from the table if the rule is: Multiply by 2, then subtract 1?

F 23

G 25

H 47

J 48

9. This table shows input numbers that have been changed to output numbers by applying a specific rule.

Input	15	25	100	150
Output	3	5	20	?

What number is missing from this table?

A 20

B 30

C 50

D 750

The chart is used to estimate wallpaper needs for rooms of different sizes. It does not take into account unpapered areas such as doors and windows. Study the chart. Then do Numbers 10 through 11.

Distance around the room in feet:	Number of rolls needed for:			
	Walls			Ceiling
	If the wall height is:			
	8 ft	10 ft	12 ft	
36	14	16	20	4
40	14	18	22	4
44	16	20	24	6
48	18	22	26	6
52	18	24	28	8
60	20	26	30	8
64	22	26	32	10
68	22	28	34	12
72	24	30	36	12
76	26	32	38	14

10. If the pattern shown in this chart continues, how many rolls of wallpaper does it take to paper the walls of a room if the distance around the room is 84 feet and the walls are 12 feet high?
- F 40
G 42
H 44
J 46
11. Patrick is papering the ceiling and the walls in a room 52 feet around with walls 10 feet high. In which of these equations does n represent the number of rolls of wallpaper he will need?
- A $n = 28 + 8$
B $24 + 6 = n$
C $n = 24 + 8$
D $22 + 6 = n$

12. What is the value of m in the inequality $m - 8 > 11$?
- F $m > 19$
G $m < 19$
H $m > 3$
J $m < 3$

13. This table shows input numbers that have been changed to output numbers by applying a specific rule.

Input	1	6	10	21
Output	3	13	21	?

What number is missing from the table if the rule is: Multiply by 2, then add 1?

- A 10
B 41
C 43
D 22

The total cost for a family of five to go to a baseball game can be represented by the equation below. Use the information to do Numbers 14 through 15.

$$t = 5a + p$$

Let: t = total cost

a = cost for one admission ticket

p = parking cost

14. If one admission ticket costs \$20 and the parking fee is \$8, how much will it cost a family of five to go to the game?
- F \$28
 - G \$60
 - H \$108
 - J \$140
15. Bargain night tickets are available at a cost of \$8 for each ticket, and the parking fee is \$5. How much will it cost a family of five to go to the game on bargain night?
- A \$13
 - B \$33
 - C \$45
 - D \$65

The salespeople at Alana's Audio Outlet earn a year-end bonus based on the formula below. Use the information to do Numbers 16 through 17.

$$b = 0.05s + 40$$

where b is the bonus and s is the salary.

16. Erin's salary is \$40,000. What is her year-end bonus?
- F \$204
 - G \$2,040
 - H \$2,400
 - J \$20,040
17. Max's salary is \$20,000. He negotiated that \$200 would replace \$40 in the formula. What is his year-end bonus?
- A \$1,020
 - B \$1,200
 - C \$2,000
 - D \$2,200

18. What is the value of r in the inequality

$$r - 2 < 6?$$

F $r < 6$

G $r < 8$

H $r = 8$

J $r > 8$

19. What is the value of p in the inequality

$$p + 2 > 8?$$

A $p < 6$

B $p > 6$

C $p < 10$

D $p > 10$

20. What is the value of s in the inequality

$$s - 4 \leq 6?$$

F $s = 2$

G $s \leq 2$

H $s = 10$

J $s \leq 10$