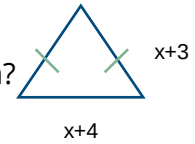
PrepLounge

ONLINE TEST MULTIPACK

Incl. Numerical Reasoning & Math Exercices

Maths I

1 The perimeter of this isosceles triangle is 16cm, what is the area?



2 A group of 90 pupils were asked if they owned a phone or a tablet.
19 people are known to own both
24 people said they only owned a tablet
35 people said they owned at least a phone.

A student is picked at random, what is the probability that the student doesn't have a phone or tablet? Give your answer as a fraction in its simplest form.

3 You have 3 piles of coins, A, B and C.
Altogether there is 36 pence.
Pile B has twice as much as Pile A.
Pile C has three times as much as Pile B.

How much money is in Pile C?

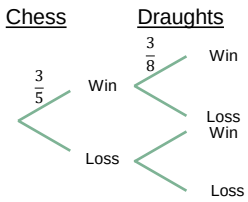
4 Write this equation as an improper fraction. $6\frac{1}{2} - 4\frac{1}{3}$

5 The number 252 can be written as 2^2 x 3^2 x W. Determine W.

Maths II

6 George is going to play one game of chess and one game of draughts. The probability that he will win the game of chess is three fifths. The probability that he will win the game of draughts is three eighths.

What is the probability he wins just one game?



7 A spherical ball has a diameter of 10cm

What is the volume of the sphere?

$$Volume = \frac{4}{3}\pi r^2$$

$$\pi = 3$$

8 In test A Max achieved 32% out of 25 marks.
In test B out of 32 marks, Charlie got 75%.

What was the difference between their marks?

9 Find the value of x.

$$3x^2 + 6x + 3 = 0$$

10 Make y the subject of the formula.

$$x = \frac{6 + 2y}{3 - y}$$

Maths III

11	If you are flying from London to New York, a distance of 3459 miles, how fast do you need to fly to make it to New York in 6 hours?
12	Simplify this equation. $\frac{x^2 + 4x - 21}{x^2 + 5x + 24}$
13	Complete the following series of numbers in a reasonable way: 7, 10, 19, 46, ?
14	A stone weighs 2kg plus half of the stones weight. How much does the stone weigh?
15	Peter is driving 30km in a motorboat on a river from Hamburg to Wedel. On his way to Wedel, he takes advantage of the current and drives at 30km/h. On his way back, he is driving against the current and travels at 10km/h. What is the average speed of both ways?

Maths IV

16	Complete the following series of numbers in a reasonable way: 3, 4, 6, 9, 14, 21, ?
17	Jeff builds a model of Ripon cathedral at a scale of 1:200, his model weighs 84kg. What would be the weight of a model on a scale of 1:100?
18	Ashleigh buys a computer for £600. The price includes VAT of 20%. What is the price of the computer without VAT?
19	A half filled bottle of water weighs 700g. The same bottle of water weighs 1200g when filled completely. What is the net weight of the bottle?
20	Complete the following series of numbers in a reasonable way: 3, 9, 12, 36, 39, ?

Maths I Answers

1

Perimeter: 16 = 3x + 10

x = 2

Base = x + 4 = 6

Using Pythagoras, height can be determined: $5^2 = 3^2 + h^2$

Rearranging: h = 4

Area = 1/2 (base x height) = 1/2(6x4)

= 12cm²

2

Both = 19

Tablet = 24

Phone = 16

None = 31

Total no. students = 90

Probability student has neither a phone or a tablet = **31/90**

3

Pile A = x , Pile B = 2x, Pile C = 6x

36 = x + 2x + 6x = 9x

x = 4

Pile A = 4 , Pile B = 8, Pile C = 24

4

$$6\frac{1}{2} = \frac{13}{2} = \frac{39}{6}$$

$$4\frac{1}{3} = \frac{13}{3} = \frac{26}{6}$$

$$\frac{13}{2} + \frac{13}{3} = \frac{65}{6}$$

5

4 x 9 x W = 252

36 x W = 252

W = 7

Maths II Answers

6

$\frac{3}{5} * \frac{5}{8} = \frac{15}{40}$

$\frac{2}{5} * \frac{3}{8} = \frac{6}{40}$

$\frac{15}{40} + \frac{6}{40} = \frac{21}{40}$

7

$(\frac{4}{3})(3)(5^2) = 100cm^2$

8

Max = 8

Charlie = 24

24 - 8 = **16**

9

Divide through by 3:

$x^2 + 2x + 1 = 0$

(x+1)(x+1)

x = -1

10

x(3-y) = 6 + 2y

3x - yx = 6 + 2y

3x - 6 = y(2-x)

$y = \frac{3x - 6}{2 - x}$

11 3459 ÷ 6 = **576.5 mph**

12
$$\frac{x^2 + 4x - 21}{x^2 + 5x + 24}$$
$$= \frac{(x-3)(x+7)}{(x-3)(x+8)}$$
$$= \frac{(x+7)}{(x+8)}$$

13 7,10,19,46,?

Differences between: 3, 9, 27

Multiple of 3 pattern, 27 x 3 = 81

46 + 81 = 127

Completing the sequence: 7, 10, 19, 46, **127**

14 s = 2kg + 0.5s

0.5s = 2kg

s = **4kg**

15 60km in 4 hours

60/4 = **15kmh**

16

Differences between the numbers = 1, 2, 3, 5, 7
Differences between the differences = 1, 1, 2, 2
Next number in this sequence should therefore be 3 and the one above 10.
This makes the missing number in the original sequence 21 + 10 = 31

3, 4, 6, 9, 14, 21, **31**

17

84 x 200 = 16,800kg (weight at full size)

16,800 ÷ 100 = **168kg**

18

600 x 0.8 = **£480**

19

2(700 - x) = 1200 - x
1400 - 2x = 1200 -x
200g = x

20

3, 9, 12, 36, 39, ?
Difference between each number = x3, +3, x3, +3 next one must be x3
39 x 3 = **117**

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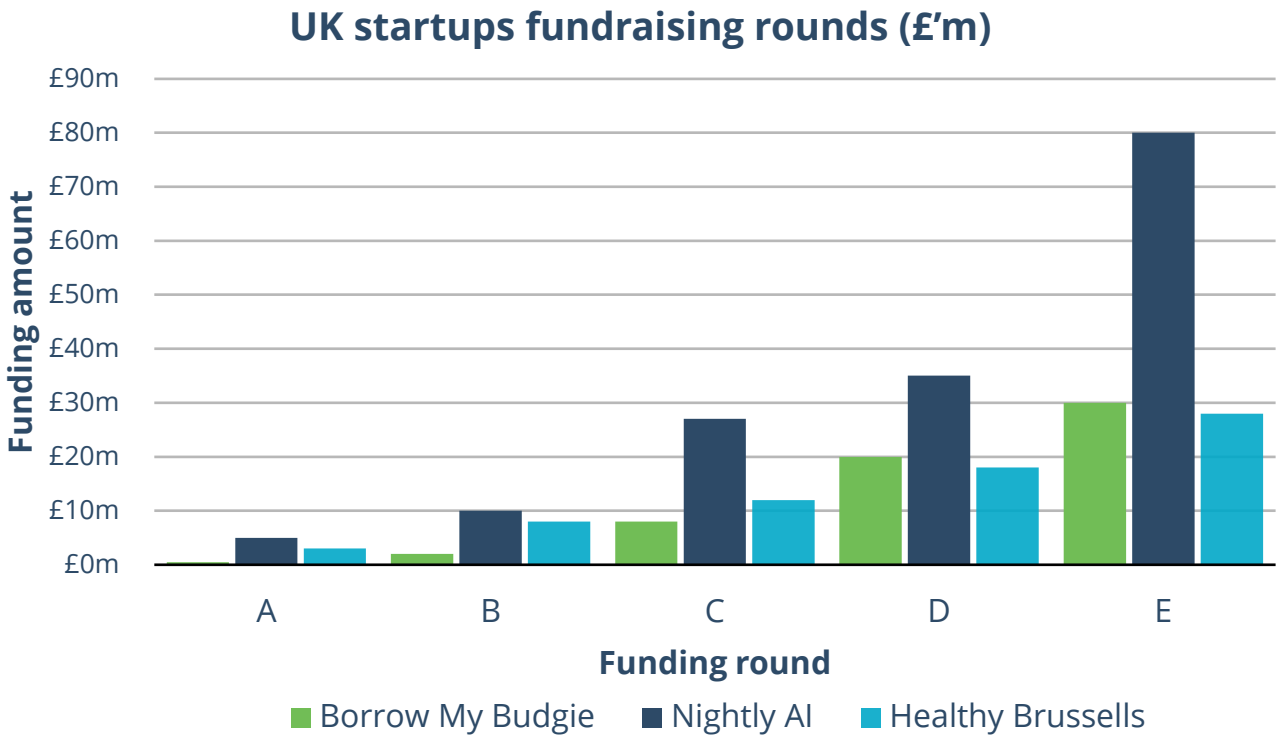
Numerical Reasoning I

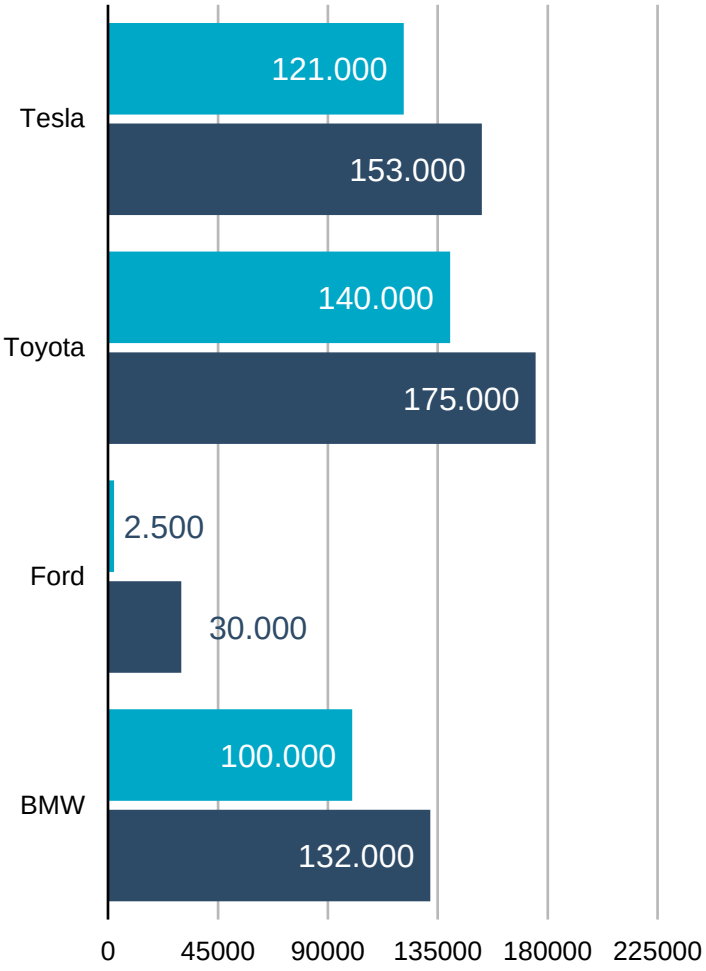


Share split at series C	Borrow My Budgie	Nightly AI	Healthy Brussells
Employees	1,200,000	13,000	113,000
Founders	5,400,000	10,000	400,000
Investors	11,400,000	27,000	265,000
Valuation	**£20m**	**£75m**	**£32m**

1	Which companies employees stock options were the most valuable at series C?
2	Which companies founders stock options were the most valuable at series C?
3	To the nearest 10m how much investment has Nightly AI raised in total?
4	If the current investors in Borrow my Budgie received no new shares at D, how much were they diluted by?
5	By what percentage did the amount raised increase for Borrow my Budgie from series D to E?

Numerical Reasoning II

Fully electric vehicles sold



Global car market share

	'17	'18
Tesla	0.23 %	0.28 %
Toyota	9.46 %	9.36 %
Ford	5.83 %	5.88 %
BMW	1.72 %	1.81 %

Note: Tesla only produces fully electric vehicles

6	If Ford bought Tesla in 2018, by what percentage would their share of the overall market increase?
7	How many non-electric cars did Ford make in 2018?
8	Which companies electric car sales increased by the smallest percentage in 2018?
9	If Tesla collapsed tomorrow and their share of the market was distributed evenly between Ford, BMW, & Toyota. How many electric cars would BMW now make?
10	What percentage of total car sales did fully electric vehicles make in 2017?

Numerical Reasoning III

Age breakdown of festival attendees

Ticket type	<20	21-30	31-40	41-50	50+
Early bird	856	2120	1789	1701	1534
Weekend	1148	833	759	467	353
4 day	359	2478	1488	1298	677
3 day	662	785	799	432	172

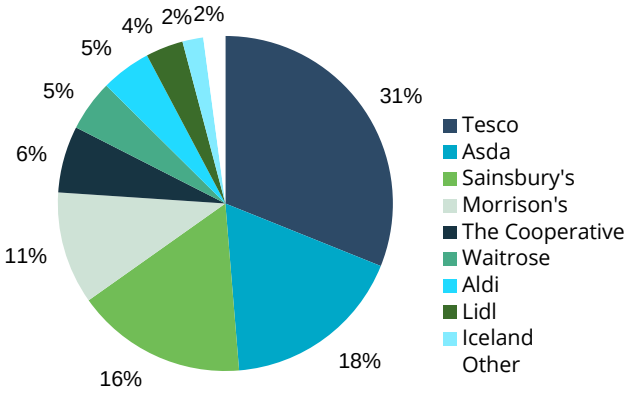
Ticket sales

Ticket type	Price	#tickets available	% sold
Early bird	165,00 £	8,000	100 %
Weekend	105,00 £	4,000	89 %
4 day	180,00 £	10,000	63 %
3 day	150,00 £	5,000	57 %

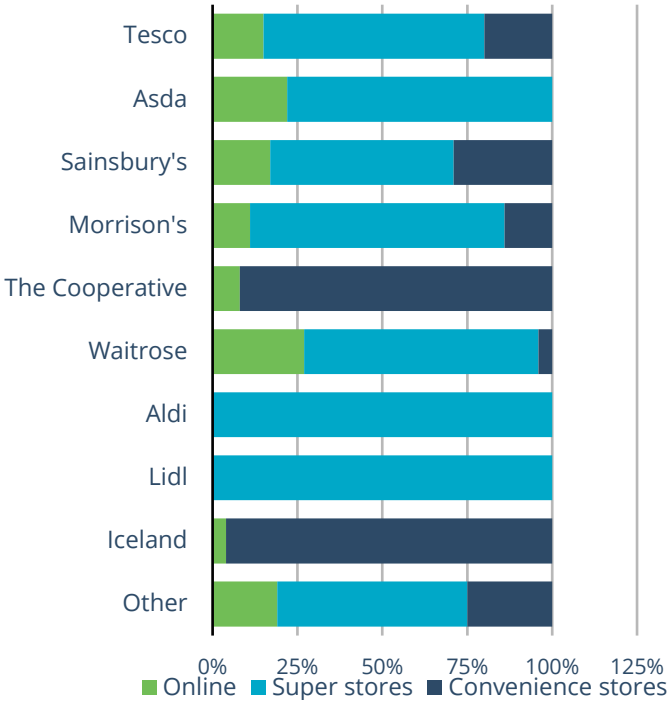
11	Assuming all those with tickets attended the festival. What was the total attendance?
12	What percentage of total ticket sales did the <20's purchases of early bird tickets make?
13	Which ticket type generated the least amount of revenue?
14	Which age bracket spent more on tickets, <20 or 50+?
15	If making tickets for 50+ free increased revenue of the other ticket sales by 8% would the festival make more or less revenue from ticket sales?

Numerical Reasoning IV

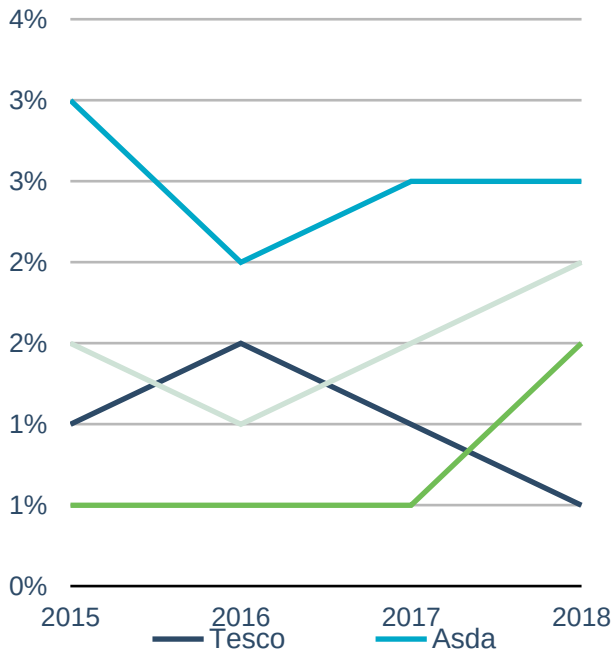
Total market size 2018



Market share 2018



Retail channel split 2018



Big 4 Growth rates 2015-18

16	In percentage of total sales, which supermarket sells the most online?
17	Which of the biggest 4 supermarkets saw the highest growth in 2018?
18	How much revenue did Aldi have from super stores?
19	What was Sainsbury's revenue in 2018.
20	In what year was Morrisons growth less than Tesco?

Numerical Reasoning I Answers

1	Borrow my Budgie = £1.3m **Nightly AI = £19.5m** Healthy Brussels = £4.64m
2	Borrow my Budgie = £6m Nightly AI = £15m **Healthy Brussels = £16.45m**
3	5+10+27+35+80 = **£157m = £160m to the nearest £10m**
4	18 million new shares takes total to 36m. 18/36 = **50% dilution**
5	(30 - 20)/20 = **50%**

Numerical Reasoning II Answers

6	0.28/5.88 = **4.76%**
7	153,000 = 0.28% 153,000/0.0028 = 54,642,857 Ford = 5.88% of 54,642,857 = 3,213,000 cars in total 3,213,000 - 30,000 = **3,183,000**
8	Tesla = 26.4% **Toyota = 25%** Ford = N/A BMW = 32%
9	153,000/3 = 51,000 132,000 + 51,000 **= 183,000**
10	121,000 + 140,000 + 100,000 = 361,000 361,000/54,642,857 = 0.0066 **= 0.66%**

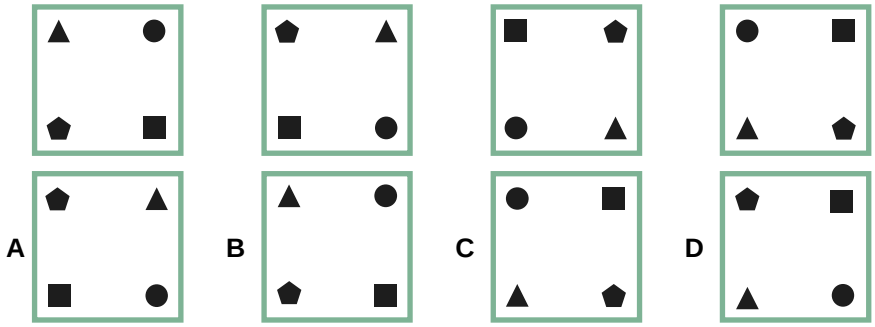
Numerical Reasoning III Answers

11	(8000)+(4000 x 0.89)+(10000 x 0.63)+(5000 x 0.57) = **20,710**
12	856/20710 = 0.0413 = **4.13%**
13	Early bird: £165 x 8000 = £1,320,000 Weekend: £105 x 3560 = **£373,800** 4 day: £180 x 6300 = £1,134,000 3 day: £150 x 2850 = £427,500
14	<20: (856 x £165)+(1148 x £105)+(359 x £180)+(662 x £150) = £425,700 **50+:** (1534 x £165)+(353 x £105)+(677 x £180)+(172 x £150) = **£437,835**
15	Early bird: (8000 - 1534) x £165 x 1.08 = £1,152,241.2 Weekend: (3560 - 353) x £105 x 1.08 = £363,673.8 4 day: (6300 - 677) x £180 x 1.08 = £1,093,111.2 3 day: (2850 - 172) x £150 x 1.08 = £433,836 **Previous total = £3,255,300** New total = £3,042,862.2

16	**Waitrose**
17	**Asda**
18	£218.5bn x 0.05 = **£10.925bn**
19	£218.5bn x 0.16 = **£34.96bn**
20	**2016**

Diagrammatical I

1



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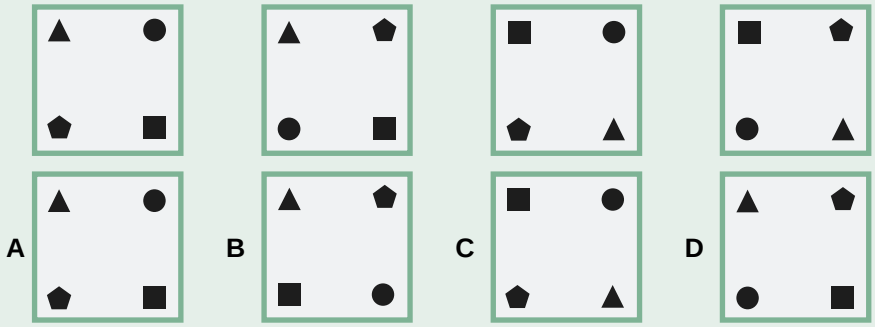

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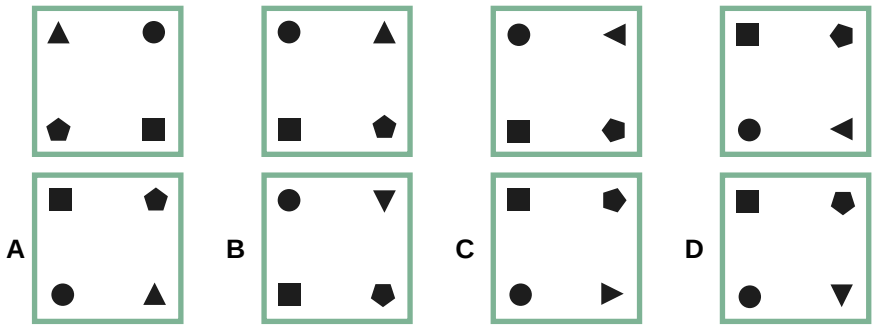

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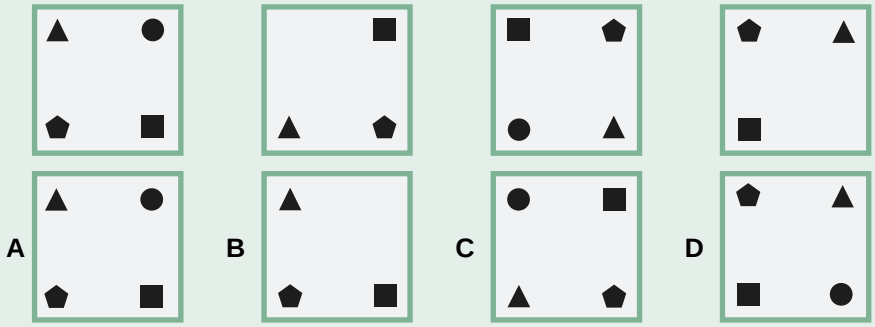

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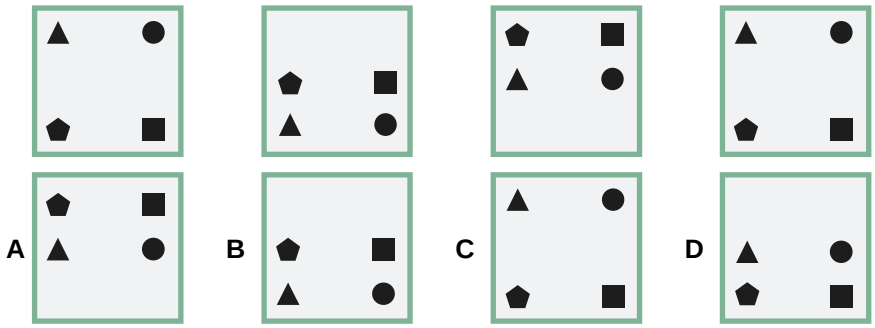
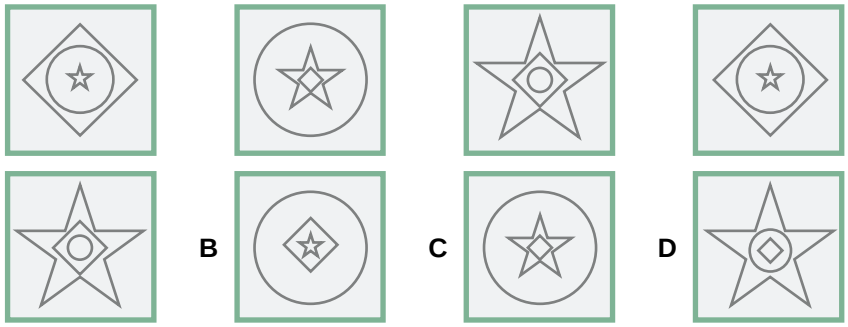


Diagrammatical II

6



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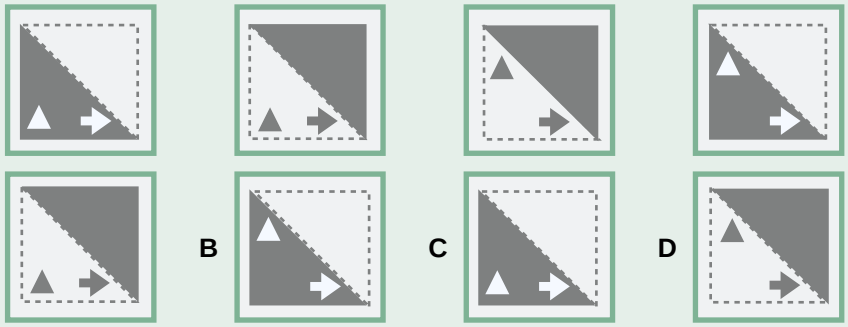

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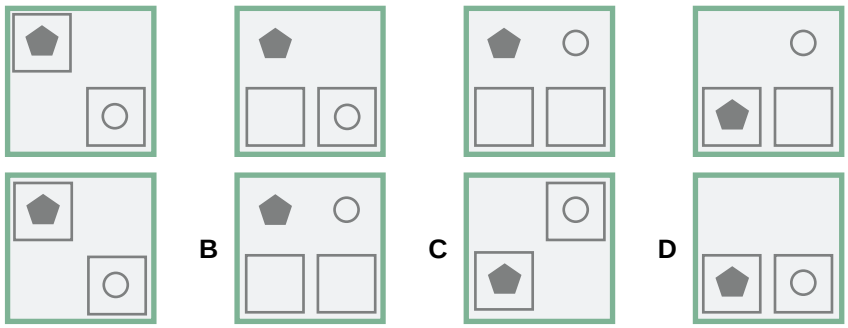

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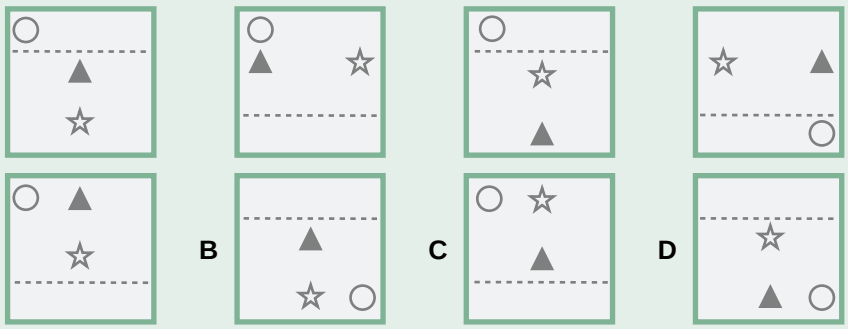

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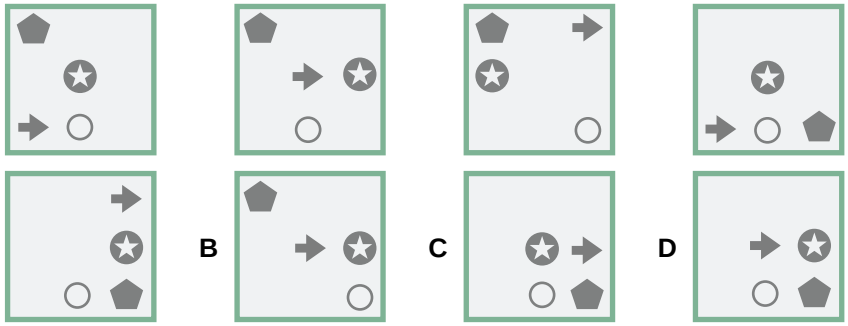
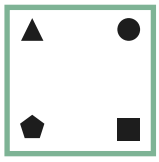
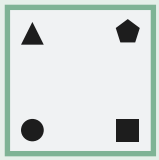
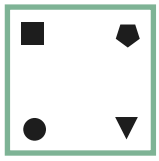
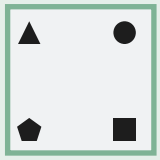
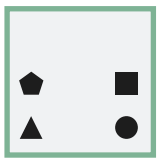
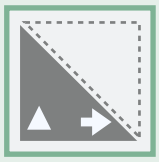
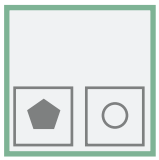


Diagrammatical I Answers

1	**B** 	Clockwise rotation of all shapes
2	**D** 	Diagonally opposite shapes swap
3	**D** 	1. Vertically mirrors 2. The triangle and pentagon rotate 90 degrees clockwise 3. Horizontally mirrors **4. The triangle and pentagon rotate 90 degrees clockwise**
4	**A** 	Anticlockwise rotation with the removal of the circle every second box
5	**B** 	All objects “snake” (like the Nokia phone game) upwards

Diagrammatical II Answers

6	**C**		Outside object moves into the centre, other objects retain their order but move outwards.
7	**C**		1. The shaded and dotted triangles switch 2. The small triangle moves vertically **3. The sequence repeats**
8	**D**		On the left side, the box moves first and the shape follows. On the right side, the shape moves first and the box follows.
9	**B**		Multiple patterns: The line alternates moving up or down The star, triangle and circle move anticlockwise
10	**D**		Multiple patterns: Arrow “snakes” diagonally up and to the right Pentagon moves every fourth box Star “snakes” horizontally to the right Circle appears to move right every third box and then moves immediately back to the centre

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