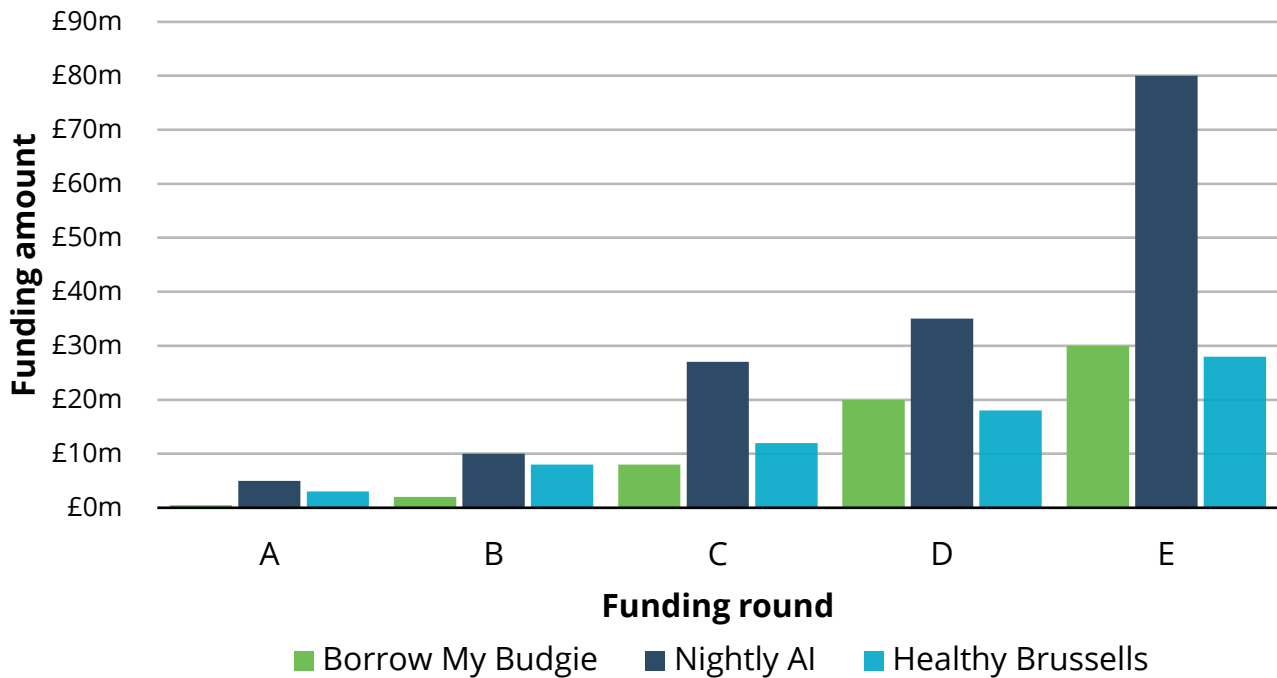


NUMERICAL REASONING

Exercises & Solutions

Numerical Reasoning I

UK startups fundraising rounds (£'m)



Share split at series C	Borrow My Budgie	Nightly AI	Healthy Brussels
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?

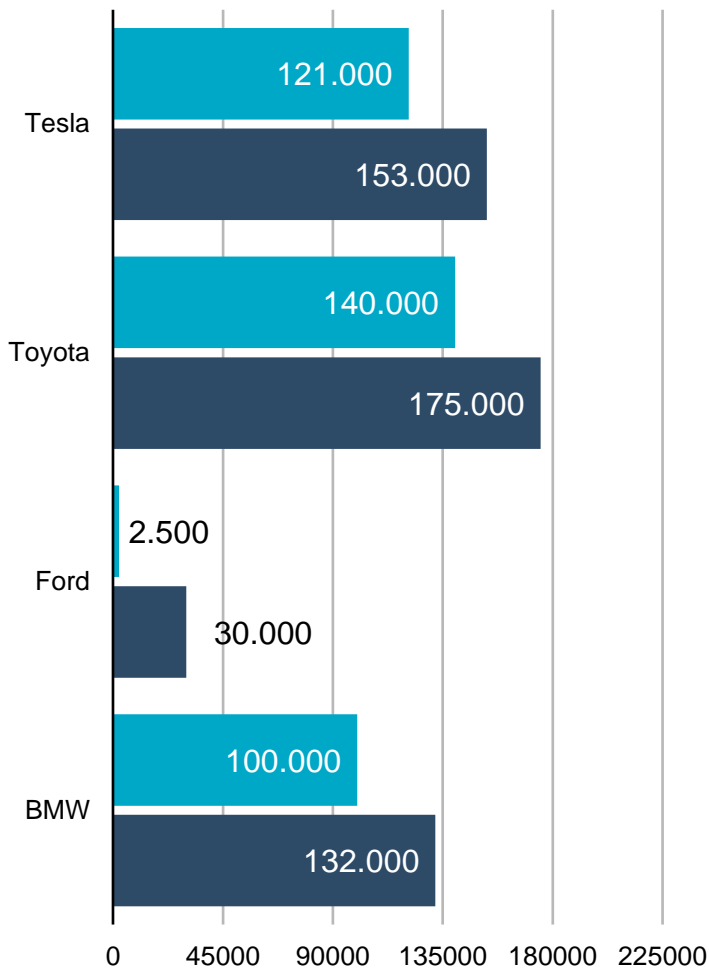
3 To the nearest 10m how much investment has Nightly AI raised in total?

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?

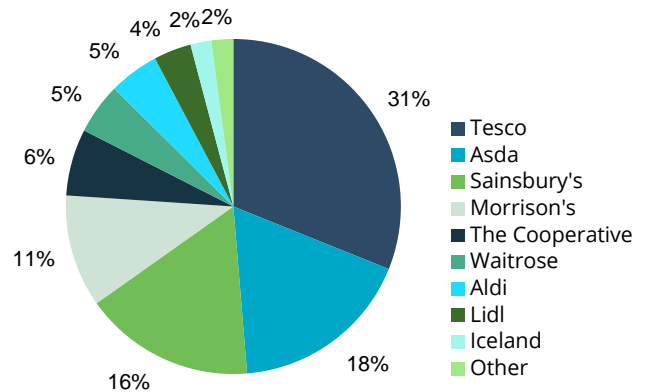
14 Which age bracket spent more on tickets, <20 or 50+?

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?

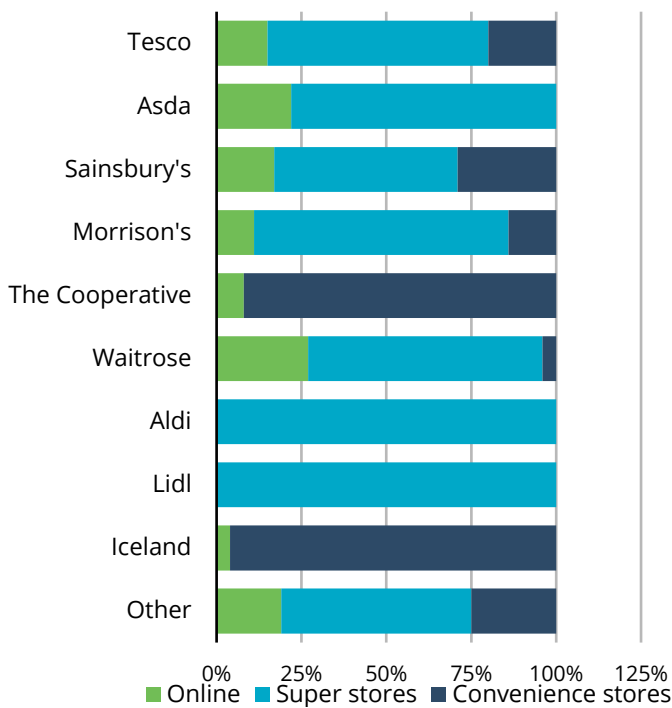
Numerical Reasoning IV



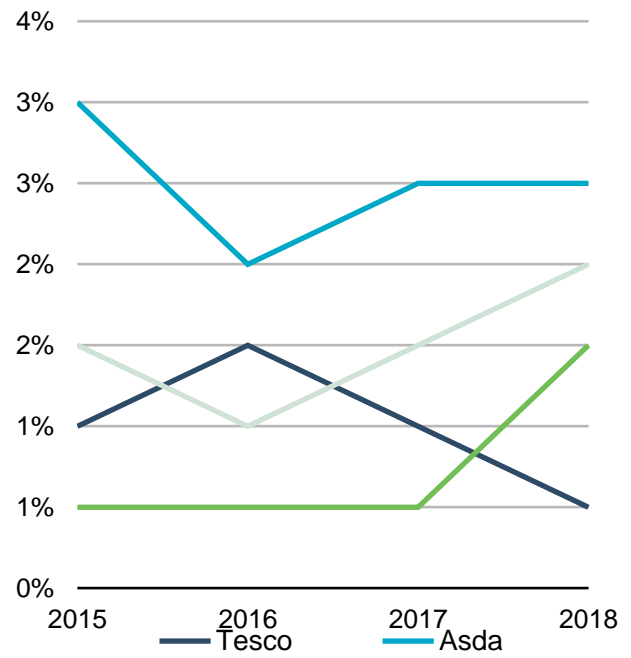
Total market size 2018



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?

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Numerical Reasoning I **Answers**

Borrow my Budgie = £1.3m

1 **Nightly AI = £19.5m**

Healthy Brussels = £4.64m

Borrow my Budgie = £6m

2 **Nightly AI = £15m**

Healthy Brussels = £16.45m

3 $5+10+27+35+80 = \mathbf{£157m} = \mathbf{£160m}$ to the nearest £10m

4 18 million new shares takes total to 36m.

$18/36 = \mathbf{50\%}$ dilution

5 $(30 - 20)/20 = \mathbf{50\%}$

Numerical Reasoning II Answers

6 $0.28/5.88 = \mathbf{4.76\%}$

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
 $3,213,000 - 30,000 = \mathbf{3,183,000}$

8 Tesla = 26.4%
Toyota = 25%
Ford = N/A
BMW = 32%

9 $153,000/3 = 51,000$
 $132,000 + 51,000 = \mathbf{183,000}$

10 $121,000 + 140,000 + 100,000 = 361,000$
 $361,000/54,642,857 = 0.0066$
 $= \mathbf{0.66\%}$

Numerical Reasoning III Answers

11 $(8000)+(4000 \times 0.89)+(10000 \times 0.63)+(5000 \times 0.57) = \mathbf{20,710}$

12 $856/20710 = 0.0413 = \mathbf{4.13\%}$

13
Early bird: $\pounds 165 \times 8000 = \pounds 1,320,000$
Weekend: $\pounds 105 \times 3560 = \mathbf{\pounds 373,800}$
4 day: $\pounds 180 \times 6300 = \pounds 1,134,000$
3 day: $\pounds 150 \times 2850 = \pounds 427,500$

14
<20: $(856 \times \pounds 165)+(1148 \times \pounds 105)+(359 \times \pounds 180)+(662 \times \pounds 150) = \pounds 425,700$
50+: $(1534 \times \pounds 165)+(353 \times \pounds 105)+(677 \times \pounds 180)+(172 \times \pounds 150) = \mathbf{\pounds 437,835}$

15
Early bird: $(8000 - 1534) \times \pounds 165 \times 1.08 = \pounds 1,152,241.2$
Weekend: $(3560 - 353) \times \pounds 105 \times 1.08 = \pounds 363,673.8$
4 day: $(6300 - 677) \times \pounds 180 \times 1.08 = \pounds 1,093,111.2$
3 day: $(2850 - 172) \times \pounds 150 \times 1.08 = \pounds 433,836$

Previous total = $\pounds 3,255,300$

New total = $\pounds 3,042,862.2$

Numerical Reasoning IV Answers

16 **Waitrose**

17 **Asda**

18 $\text{£}218.5\text{bn} \times 0.05 = \text{£}10.925\text{bn}$

19 $\text{£}218.5\text{bn} \times 0.16 = \text{£}34.96\text{bn}$

20 **2016**

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