

12. Ratio, Proportions and Rates of Change

Planning a group holiday

Maeve and her friends have been saving up all year to go on holiday next summer. They now need to plan and budget to cover accommodation, activities and food. Maeve has taken responsibility over managing the holiday budget and has tasked the rest of the group to do the research for each area of the budget and bring her a shortlist of options to choose from.

Task one: Accommodation

Maeve and her four friends plan to go away for 12 nights arriving on Saturday 6th August and heading home on Thursday 18th August. One of her friends has brought her a short list of accommodation options in the area (see page 4).

1. What are some of the factors you might consider when choosing accommodation for a holiday?

Example answers include: price, location, facilities, and whether meals are included.

2. What is the average price per room per night of staying in the hotel for the duration of their trip (exclude wifi)?

They arrive on a Saturday, therefore:
Number of nights at the weekend rate: 3
Number of nights at the week day rate: 9
 $(3 \times £106) + (9 \times £77) = £1,011$
 $£1,011 / 12 = £84.25$

3. What would be the total cost to stay in each accommodation for the duration of the holiday (including any supplemental fees)?

Hotel: $(£1,011 \times 2) + (£3.50 \times 2 \times 12) = £2,106$

B&B: $(3 \times £105 \times 12) + (3 \times 5) = £3,795$

Apartment: $(£382 \times 2) + £27.50 = £791.50$

Resort: $(£94 \times 5 \times 12) = £5,640$

4. Calculate the average cost per person per night and comment on how much they would each need to spend per day on food and drink for the all-inclusive resort to be better value than the B&B?

Hotel: $(£2,106 / 5) / 12 = £35.10$

B&B: $(£3,795 / 5) / 12 = £63.25$

Apartment: $(£791.50 / 5) / 12 = £13.19$

Resort: £94

If the party expect to spend more than £30.75 a day on food and drink each (excluding breakfast) then the resort would be better value than the B&B.

Task two: Food shopping

Maeve and her friends decide to do an online food shop before they go so that they have some essentials to see them through the first few days of the trip.

An extract from their shopping list is shown below, along with some options from a supermarket. For each item on the shopping list, calculate which option offers the best value and comment on whether this would be an appropriate purchase given they also want to minimise waste.

Example calculation:

Washing-up liquid:

1150ml bottle - £2.00 = 0.17p/ml

433ml bottle - £1 = 0.23p/ml

1L bottle - £1.25 = 0.13p/ml

1.35L bottle - £1.60 = 0.12p/ml

The best value option is the 1.35L bottle. However, this is also the largest bottle of washing-up liquid and the shopping list asks for a small bottle. Therefore, although it is the best-value option it is also the most wasteful.

Accommodation options

Hotel	
Number of rooms needed	2
Price per room per night (Sunday - Thursday)	£77
Price per room per night (Friday and Saturdays)	£106
Wifi	£3.50 per room per day

Bed and Breakfast	
Number of rooms needed	3
Price per room per night	£105
Wifi	£5 per room (valid for the total stay)
Breakfast included	

Self-catered apartment	
Price per week (minimum stay is 2 weeks):	£382.00
Cleaning fee	£27.50

All-inclusive resort	
Price per person per night	£94.00
Meals and drinks included	

Shopping list

750g of pasta

2L of orange juice

Apples x 10

Washing up liquid (small
bottle)

Olive oil (small bottle)

Cereal bars x 10

1kg of vegetables

400g of cheese

Price list

Vegetables

Mixed bag (460g)	3 for 2, £2.00 per bag
Cauliflower and broccoli florets (400g)	£1.73

Washing-up liquid

1150ml bottle	£2.00
433ml bottle	£1
1L bottle	£1.25
1.35L bottle	£1.60

Cereal bars

Multipack (6 x 35g)	£3.20
Individual cereal bars (35g)	£0.60 each - buy 3 get 1 free

Olive oil

1L bottle	£3.00
700ml bottle	£2.40

Pasta

450g spaghetti pasta	£0.70
2 kg spaghetti pasta	£2.40

Apples

Pack of 6	£2.80
One loose apple	£0.62

Orange juice

1L bottle	£1.25
1.35L bottle	£1.60

Cheese

Cheddar cheese slices (250g)	2 for £3
Cheddar cheese block (350g)	£2.50