



## Questions

1. A café owner thinks that she sells more cupcakes now that she has swapped to a different kind of decorations. In July, when she was using the old decorations, she sold a mean average of 6 cupcakes per day. She records the number of cupcakes she sells per day for August, when she is using the new decorations. Did she sell more cupcakes on average with the new decorations?

Number of cupcakes sold in a day in August	Frequency
1-3	3
4-6	9
7-9	12
10-12	6
13-15	1

2. A YouTuber wants to know if they get more views on their videos about fashion or more on their videos about cooking. They produce this table about the number of views on their fashion videos:

Number of views, $x$	Frequency
$0 \leq x < 50,000$	5
$50,000 \leq x < 100,000$	7
$100,000 \leq x < 150,000$	13
$150,000 \leq x < 200,000$	1
$200,000 \leq x < 300,000$	3

They have 16 videos about cooking, which have a total of 1,625,301 views.

Which type of video gets a higher average number of views?

3. Some data is recorded about some participants in a medical study. What is the average age of the participants?

Age range (years)	Gender	Height (cm)	Eye colour
32-38	Female	170	Blue
18-24	Female	163	Brown
18-24	Male	155	Brown
39-45	Prefer not to say	171	Hazel
25-31	Other	168	Green
46-52	Female	180	Blue
67-73	Female	150	Blue
25-31	Male	165	Brown
53-59	Other	172	Blue
25-31	Male	173	Brown

**Answers**

1. Firstly, we add a midpoint column to the table:

<b>Number of cupcakes sold in a day in August</b>	<b>Frequency</b>	<b>Midpoint</b>
1-3	3	2
4-6	9	5
7-9	12	8
10-12	6	11
13-15	1	14

Then, we add a midpoint multiplied by frequency column:

<b>Number of cupcakes sold in a day in August</b>	<b>Frequency</b>	<b>Midpoint</b>	<b>Midpoint x frequency</b>
1-3	3	2	6
4-6	9	5	45
7-9	12	8	96
10-12	6	11	66
13-15	1	14	14

We then find the sum of the frequency column, and the sum of the midpoint times frequency column:

Number of cupcakes sold in a day in August	Frequency	Midpoint	Midpoint x frequency
1-3	3	2	6
4-6	9	5	45
7-9	12	8	96
10-12	6	11	66
13-15	1	14	14
	31		227

We then calculate the mean:

$$227 \div 31 = 7.32$$

So, she has sold more cupcakes on average per day in August than in July.

**Note:** This does not tell us if her new decorations are responsible for the increase in sales, just that there was an increase.

2. To find the estimated mean of the fashion video views, first we add the midpoint column:

Number of views, $x$	Frequency	Midpoint
$0 \leq x < 50,000$	5	25,000
$50,000 \leq x < 100,000$	7	75,000
$100,000 \leq x < 150,000$	13	125,000
$150,000 \leq x < 200,000$	1	175,000
$200,000 \leq x < 300,000$	3	250,000

We then add another column to show the midpoint multiplied by the frequency:

Number of views, $x$	Frequency	Midpoint	Midpoint x frequency
$0 \leq x < 50,000$	5	25,000	125,000
$50,000 \leq x < 100,000$	7	75,000	525,000
$100,000 \leq x < 150,000$	13	125,000	1,625,000
$150,000 \leq x < 200,000$	1	175,000	175,000
$200,000 \leq x < 300,000$	3	250,000	750,000

Next, we find the sum of the midpoint times frequency column to get the total estimated views, and we find the number of posts made:

Number of views, $x$	Frequency	Midpoint	Midpoint x frequency
$0 \leq x < 50,000$	5	25,000	125,000
$50,000 \leq x < 100,000$	7	75,000	525,000
$100,000 \leq x < 150,000$	13	125,000	1,625,000
$150,000 \leq x < 200,000$	1	175,000	175,000
$200,000 \leq x < 300,000$	3	250,000	750,000
	29		3,200,000

Finally, we find the mean by calculating  $3,200,000 \div 29 = 110,344.83$  views on average per fashion video.

To find the average number of views per cooking video, we calculate  $1,625,301 \div 16 = 101,581.31$  views on average per cooking video.

Therefore, we can see that, on average, she gets more views on her fashion videos than on her cooking videos.

3. The first step here is to create a tally chart:

Age range (years)	Frequency
18-24	
25-31	
32-38	
39-45	
46-52	
53-59	
60-66	
67-73	

We place a mark in the frequency column each time the age comes up.

Next, we turn this into a frequency table:

Age range (years)	Frequency
18-24	2
25-31	3
32-38	1
39-45	0
46-52	2
53-59	1
60-66	0
67-73	1

Now we can add our midpoint column, midpoint x frequency column, and the two sums:

Age range (years)	Frequency	Midpoint	Midpoint x frequency
18-24	2	21	42
25-31	3	28	84
32-38	1	35	35
39-45	0	42	0
46-52	2	49	98
53-59	1	56	56
60-66	0	63	0
67-73	1	70	70
	10		385

Therefore, the average age is  $385 \div 10 = 38.5$  years old.

**Note:** Most of the information given in the original table wasn't needed to answer the question. When doing statistical analysis this is often the case.

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