

Y8 – Summer – Block 5 – Step 1 – Understand and use the mean, median and mode Answers

Question	Answer
1	<p>a) 3  <span style="border: 1px solid blue; border-radius: 50%; padding: 2px;">mode</span>                      median                      mean</p> <p>b) 5  mode                      <span style="border: 1px solid blue; border-radius: 50%; padding: 2px;">median</span>                      mean</p> <p>c) 5  mode                      median                      <span style="border: 1px solid blue; border-radius: 50%; padding: 2px;">mean</span></p> <p>d) The median number of cubes used is 5  The modal number of cubes used is 3  The mean number of cubes used is 5</p>
2	<p>a) 6  b) 9  c) 6.2  d) <math>\frac{239}{7}</math></p>
3	<p>a) 5  b) 5  c) 4  d) 42.5  e) 13</p>
4	<p>a) 3  b) 9  c) 14.1 and 26.3  d) no mode  e) red</p>
5	<p>Each of the six numbers has increased by 1, so the mean will increase by 1  <math>1 + 5 + 8 + 12 + 22 + 36 = 84</math>  <math>84 \div 6 = 14</math></p>
6	<p>a) multiple possible answers, e.g.:  1, 5, 9, 19, 19, 19  b) range of set of numbers in part a), e.g.:  18  Students are likely to have different sets of numbers and so different ranges.</p>
7	<p>a) <math>z = 6.5</math>  b) median = 7.75, mode = 21, range = 21  c) 24</p>
8	<p><math>\frac{13x}{2}</math></p>

Y8 – Summer – Block 5 – Step 2 – Choose the most appropriate average Answers

Question	Answer												
1													
2	<p><b>mode</b>                      median                      mean</p> <p>It is the only average that can be used with qualitative data.</p>												
3	<p>a) set A: mean = 30, median = 30.5, mode = 32          set B: mean = 35, median = 30.5, mode = 32          set C: mean = 36, median = 30.5, mode = 32          set D: mean = 84, median = 30.5, mode = 32</p> <p>b) The first five numbers in the sets are the same. Only the final number is different. The median and the mode are the same in every set, but the mean increases when the final number increases.</p> <p>c) Mean: It increases as the last number increases.          Median: The median stays the same, because the middle two values are not affected.          Mode: The mode stays the same, because the last value does not duplicate any of the other values.</p>												
4	<p>a) There is no mode.          b) 8.24 m          c) 9.7 m          d) 2.1 m</p> <p>It is much smaller than the other throws, which are all around 10 m.</p> <p>e) mean = 9.775 m, median = 9.8 m          The mean was most affected by the 2.1 m throw.</p>												
5	<p>a) mean = £32,000, median = £26,000, mode = £26,000          b) median or mode</p> <p>They are less affected by the high value of the first salary. They are more representative of most of the salaries.</p>												
6	<table border="1"> <thead> <tr> <th>Type of average</th> <th>Advantages</th> <th>Disadvantages</th> </tr> </thead> <tbody> <tr> <td>mean</td> <td>8</td> <td>2, 9</td> </tr> <tr> <td>median</td> <td>1</td> <td>4, 9</td> </tr> <tr> <td>mode</td> <td>1, 3, 5</td> <td>4, 6, 7, 9</td> </tr> </tbody> </table>	Type of average	Advantages	Disadvantages	mean	8	2, 9	median	1	4, 9	mode	1, 3, 5	4, 6, 7, 9
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Y8 – Summer – Block 5 – Step 3 – Find the mean from an ungrouped frequency table Answers

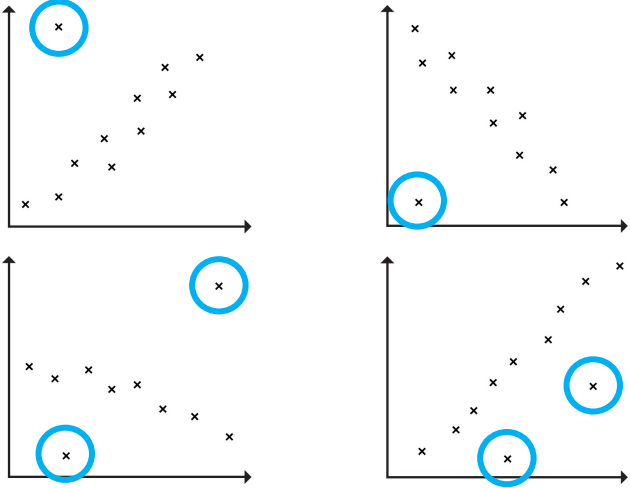
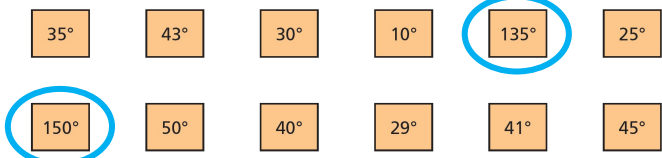
Question	Answer
1	19 Students need to justify why they prefer one method over the others.
2	a)     8     22     3     4 b)     7     8     19     21 c) Her mean is higher than the number of letters in any word. She has added up the frequencies, not the frequencies × number of letters, and divided by the total of the numbers of letters, not the frequencies. d) 3.88
3	a) 40 b) 4 c) 3.682
4	a) 37 b) 1.85
5	4
6	19.3 (to 1 d.p.)

Y8 – Summer – Block 5 – Step 4 – Find the mean from a grouped frequency table Answers

Question	Answer																												
1	a) 5 b) 3 c) 15 d) 15.5 e) 25 f) 45.5																												
2	a) 5 b) 5.5 c) 15 d) 15.5 e) 30 f) 30.5																												
3	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">Phone bill, <math>x</math> (£)</th> <th style="width: 15%;">Frequency</th> <th style="width: 15%;">Midpoint</th> <th style="width: 45%;">frequency <math>\times</math> midpoint</th> </tr> </thead> <tbody> <tr> <td><math>0 \leq x &lt; 10</math></td> <td>7</td> <td>5</td> <td><math>7 \times 5 = 35</math></td> </tr> <tr> <td><math>10 \leq x &lt; 20</math></td> <td>9</td> <td>15</td> <td><math>9 \times 15 = 135</math></td> </tr> <tr> <td><math>20 \leq x &lt; 30</math></td> <td>5</td> <td>25</td> <td><math>5 \times 25 = 125</math></td> </tr> <tr> <td><math>30 \leq x &lt; 40</math></td> <td>3</td> <td>35</td> <td><math>3 \times 35 = 105</math></td> </tr> <tr> <td></td> <td>24</td> <td></td> <td>400</td> </tr> </tbody> </table> <p>estimate of mean = <math>\frac{\text{total cost}}{\text{total frequency}} = \frac{400}{24} = \text{£16.67}</math></p>	Phone bill, $x$ (£)	Frequency	Midpoint	frequency $\times$ midpoint	$0 \leq x < 10$	7	5	$7 \times 5 = 35$	$10 \leq x < 20$	9	15	$9 \times 15 = 135$	$20 \leq x < 30$	5	25	$5 \times 25 = 125$	$30 \leq x < 40$	3	35	$3 \times 35 = 105$		24		400				
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$3 \leq h < 4$	5	3.5	17.5																										
$4 \leq h < 6$	4	5	20																										
	30		74																										
5	a) 6.5 kg (to 1 d.p.) b) $5 \leq m < 10$																												
6	3.0 minutes (to 1 d.p.)																												

Question	Answer				
7	a)	Time, $t$ (minutes)	Frequency	Midpoint	frequency $\times$ midpoint
0 < $t$ $\leq$ 15		3	7.5	22.5	
15 < $t$ $\leq$ 30		10	22.5	225	
30 < $t$ $\leq$ 40		17	35	595	
40 < $t$ $\leq$ 50		12	45	540	
50 < $t$ $\leq$ 60		20	55	1,100	
b)	$50 \leq t < 60$				
	c)	40.0 minutes (to 1 d.p.)			
		d)	No.		
			It does not affect the midpoint and therefore does not affect the estimate of the mean.		

Y8 – Summer – Block 5 – Step 5 – Identify outliers Answers

Question	Answer
1	 <p>Students should have circled the same points. There can be more than one outlier for a set of data.</p>
2	<p>18 minutes It is significantly higher than the other values.</p>
3	<p>05/01/20 multiple possible answers, e.g.: It was not an important game.</p>
4	<p>32, 36, 62 multiple possible answers, e.g.: They are the parents and a grandparent.</p>
5	<p>a)</p>  <p>They are more than a right angle.</p> <p>b) Yes. 10° is significantly lower than the other values.</p>
6	<p>Yes. 2.5 and 5.6 All the other students live within 2 miles of school.</p>
7	<p>day 11, 27°C multiple possible answers, e.g.: The temperature could have been recorded wrongly.</p>

Y8 - Summer - Block 5 - Step 5 - Identify outliers Answers (continued)

Question	Answer
8	a) £88 b) £100 c) £170 d) mean = £78.89, range = £15 When the outlier is removed, both the mean and the range go down significantly.

Question	Answer												
1	<p>a) Teddy: 7.17 Rosie: 7 Esther: 6.83 Scott: 7</p> <p>b) Teddy: 5 Rosie: 0 Esther: 7 Scott: 2</p> <p>c) Teddy</p> <p>d) Rosie</p> <p>e) Rosie and Scott, because they had the most consistent marks. Teddy and Esther may have revised for some of the tests, but not all of them.</p>												
2	<p>a) car The mean is lower.</p> <p>b) car The range is higher.</p>												
3	<p>a) Brett (24 seconds)</p> <p>b) Filip: 26 seconds Brett: 29 seconds</p> <p>c) Filip: 4 seconds Brett: 8 seconds</p> <p>d) Filip</p> <p>e) Filip</p>												
4	<p>a) 22</p> <p>b) 33</p> <p>c) Median: On average, the girls' team scored more points per game, because their median is lower. Range: The boys' team was more consistent, because their range is smaller.</p>												
5	<p>a) author A: 9 author B: 13</p> <p>b) On average, author B used more words per sentence, as their median is greater. Author A is more consistent, as their range is smaller.</p>												
6	<p>a)</p> <table border="1" data-bbox="261 1603 922 1732"> <thead> <tr> <th></th> <th>Mean</th> <th>Median</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>English marks</td> <td>50.1</td> <td>47</td> <td>42</td> </tr> <tr> <td>Science marks</td> <td>60.6</td> <td>64.5</td> <td>50</td> </tr> </tbody> </table> <p>b) On average, the Science scores were higher, because the mean/median for Science is greater than the mean/median for English. The English scores were more consistent, because the range of English scores is smaller.</p>		Mean	Median	Range	English marks	50.1	47	42	Science marks	60.6	64.5	50
	Mean	Median	Range										
English marks	50.1	47	42										
Science marks	60.6	64.5	50										



Y8 – Summer – Block 5 – Step 6 – Compare distributions using averages and the range Answers (continued)

Question	Answer
7	<p>inexperienced runners: mean = 67.8 seconds, range = 41 seconds On average, the experienced runners were faster, as their mean is lower. The experienced runners were more consistent, as their range is smaller.</p> <p>If the runner who took 98 seconds is not included: mean = 64.4 seconds, range = 18 seconds On average, the experienced runners are still faster and more consistent.</p>