

# FKS F3 Test 9: Measures of Central Tendency

## S3 Mathematics

### Test 9: Measures of Central Tendency

Name : \_\_\_\_\_

Class : .

Date : \_\_\_\_\_

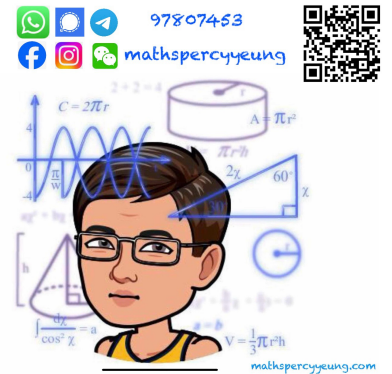
Time : 45 minutes

#### Instructions to students:

- Unless otherwise specified, show your workings clearly.
- Unless otherwise specified, numerical answers should be exact or correct to 3 significant figures.

#### Marks:

Section	Marks	
A: Basic Algebraic Skills	/9	
B: Multiple Choice Questions	/12	
C(1): Short Questions	/12	
C(2): Long Questions	/13	<b>/37</b>
D: Bonus (Maximum: 2 marks)	+	
PP / U ☹	PP -	U -
<b>Total:</b>		<b>%</b>



#### Section A: Basic Algebraic Skills (9 marks)

- Simplify  $\frac{(x^3y^4)^2}{x^{-5}y^6}$  and express the answers with positive indices.

(3 marks)

2. Make  $h$  the subject of the formula  $\frac{k}{h-2} = \frac{4}{h-k}$ .

(3 marks)

3. Factorize

(a)  $16x^2 - 9y^2$ ,

(b)  $16x^2 - 9y^2 - 4ax + 3ay$ .

(3 marks)

16
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**Section B: Multiple Choice Questions (12 marks)**

3. The mean weight of 4 boys and 5 girls is 36 kg. If the mean weight of the 5 girls is 34 kg, find the mean weight of the 4 boys.

- A. 38 kg
- B. 38.5 kg
- C. 39 kg
- D. 39.5 kg

4. The median of a set of seven data  $n - 2, n - 3, n + 7, n - 4, n, n + 3$  and  $n - 8$  is 7. Find the mean of the set of the data.

- A. 8
- B. 9
- C. 10
- D. 11

5. The following table shows the distribution of the numbers of hours that 50 students spent on revision yesterday.

<b>Number of hours</b>	1	2	3	4	5
<b>Frequency</b>	7	$3n + 2$	18	$n$	3

Find the median and the mode of the above distribution.

- A. median = 2 hours, mode = 2 hours  
B. median = 2 hours, mode = 3 hours  
C. median = 3 hours, mode = 2 hours  
D. median = 3 hours, mode = 3 hours
6. The mean height of 5 girls is  $y$  cm now. 3 years ago, all of them were 8 cm shorter. Find their mean height 3 years ago.
- A.  $(y + 8)$  cm  
B.  $(y + 3)$  cm  
C.  $(y - 3)$  cm  
D.  $(y - 8)$  cm
7. Consider the following positive integers:

2    3    4    5    8    8    9     $x$      $y$

Let  $a$  and  $b$  be the median and the mode of the above positive integers respectively. If the mean of the above positive integers is 5, which of the following must be true?

- I.  $x + y = 6$   
II.  $a \leq 5$   
III.  $b = 8$
- A. I and II only  
B. I and III only  
C. II and III only  
D. I, II and III

8. The table below shows Kevin's scores (in marks) in two parts of an interview.

	Part A	Part B
Score (marks)	68	60
Weight	$x$	$y$

If Kevin's weighted mean score is 66 marks, find  $x : y$ .

- A. 1 : 2
- B. 1 : 3
- C. 2 : 1
- D. 3 : 1

Write down the correct answers in the boxes.

3	4	5	6	7	8

/12

**Section C(1): Short Questions (12 marks)**

9. The table below shows the numbers of uniforms that a group of students own.

Number of uniforms owned	1	2	3	4
Frequency	4	6	$k$	2

It is given that  $k$  is a positive integer. The mean of the numbers of uniforms that the students own is 2.4.

- (a) Find the value of  $k$ .
- (b) Find the median of the numbers of uniforms that the students own.

(4 marks)

/4

10. The table below shows the daily times spent (correct to the nearest minute) doing homework by a group of students.

<b>Time spent (min)</b>	1 – 30	31 – 60	61 – 90	91 – 120
<b>Class mark (min)</b>				
<b>Frequency</b>	6	14	11	5

- (a) Complete the above table.  
(b) Find the mean and the modal class of the daily times spent doing homework by the students.

(4 marks)

11. Devin's mean score in three quizzes is 65 marks and her score in the fourth quiz is 77 marks.

- (a) Find the mean score of Devin in the four quizzes.  
(b) It is known that the scores of all the quizzes of Devin are decreased by 80% when entering into the score sheet. Find the mean score of Devin in the four quizzes after the adjustment.

(4 marks)

**Section C(2): Long Questions (13 marks)**

In this section, answer either part(X) or part (Y) in each question. Do not answer both parts. If both parts in a question in this section are attempted, only **part (X)** will be marked.

**12X.** The following stem-and-leaf diagram shows the ages of 10 users in a sports centre.

**Ages of 10 users in a sports centre**

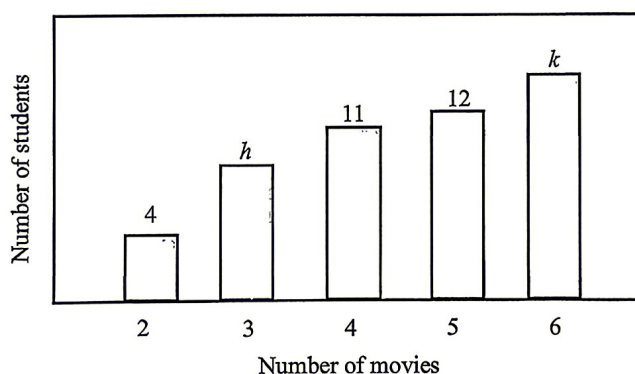
<u>Stem (10)</u>	<u>Leaf (1)</u>
1	4 <i>a</i> 8
2	7 <i>b</i>
3	5 5 6 6 <i>c</i>

If the mean, the median and the mode of the ages of these 10 users are 28, 32 and 36 respectively, find the values of *a*, *b* and *c*.

(3 marks)

**12Y.** The bar chart below shows the numbers of movies watched by a group of university students in a month, where  $4 < h < 11 < k$ .

**Numbers of movies watched by a group of university students**



It is known that the median of the numbers of movies watched by the students is 4.5.

- (a) Find *h* and *k*.
- (b) Four more students now join the group. It is found that the numbers of movies watched by these four students are all different and the maximum and the minimum of the numbers of movies watched by the students remain unchanged. Find
  - (i) the least possible median of the numbers of movies watched by the students,
  - (ii) the greatest possible mean of the numbers of movies watched by the students.

(6 marks)

Solution: Q12. (X/Y) (\*Please circle the question that you attempt in Q.12)

13X. The table below shows the marks of Kent in the 3 papers of a science examination.

	<i>Physics</i>	<i>Chemistry</i>	<i>Biology</i>
<i>Mark</i>	80	60	40
<i>Weight</i>	5	4	3

It is given that students with weighted mean marks above 60 can take part in an experiment. Can Kent take part in the experiment? Explain your answer.

(3 marks)

13Y. Jackson and Jack got the following results for Mathematics this term.

	<b>Homework</b>	<b>Test</b>	<b>Examination</b>
<b>Jackson</b>	90	91	83
<b>Jack</b>	85	78	91
<b>Weight</b>	<i>a</i>	3	<i>b</i>

- (a) If the weighted mean marks of Jackson and Jack are 86.1 and 86.5 respectively, find the values of *a* and *b*.
- (b) Their nice Mathematics teacher awarded Jackson 5 more marks on “Homework” for submitting all of his homework on time.
- (i) Jackson claims that his new weighted mean mark is higher than that of Jack. Do you agree? Explain your answer.
- (ii) The school is considering revising the assessment policy next term by increasing the weight of “Homework” while keeping the weights of Test and Examination unchanged. Without calculation, explain who (Jackson or Jack) will benefit more from this change.

(7 marks)

Solution: Q13. ( X. ) (\*Please circle the question that you attempt in Q.13)



**Section D: \*Bonus Questions (2 marks)**

14. Prove that if a number of new data points are added to an original dataset, and the mean of these new data points is the same as the mean of the original dataset, then the mean of the new combined dataset will remain unchanged.

/(+2)

**END OF PAPER**