GRADE 11 EXEMPLAR PAPERS

MATHEMATICS III

Time: 2 hours 100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

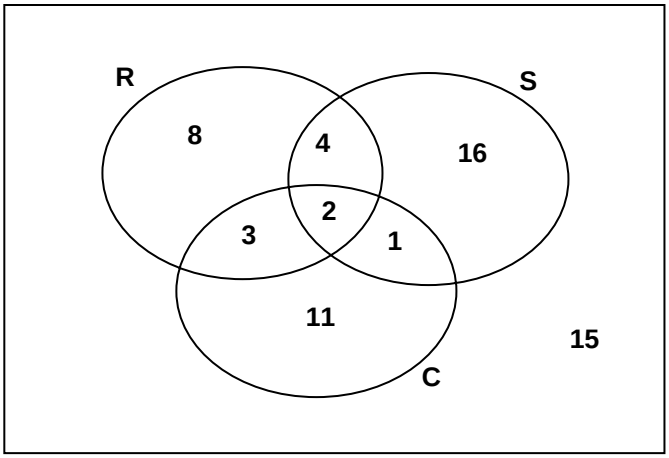
1. This examination consists of 12 numbered pages, excluding this coversheet.
2. All questions are to be answered on this question paper.
3. Fill in your name in the space provided below.
4. You may use a non-programmable calculator.

Name:												
Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**	
9	**4**	**6**	**9**	**4**	**6**	**3**	**8**	**10**	**9**	**12**	**11**	**9**	**100**

Question 1

A sample of 60 people is asked which of 3 sports they watch on TV. The sports are Rugby (R), Soccer (S) and Cricket (C).

The results are shown in the Venn diagram below.



A person is selected at random from the group. Giving all your answers in simplest fraction form, find the probability that a randomly selected person

(a) watches NONE of the sports (1)

(b) watches soccer (1)

(c) watches rugby AND soccer (1)

(d) watches cricket OR soccer (1)

(e) does not watch cricket (1)

(f) watches rugby but does not watch cricket (2)

(g) watches neither rugby NOR cricket (2)

9 marks

Question 2

S is the sample space of Natural numbers LESS THAN 13. One number is drawn randomly from **S.**

O is the event "the number is odd". **P** is the event "the number is prime".
F is the event "the number is a factor of 6".

Represent this information in a Venn diagram.

4 marks

Question 3

236 students were asked what type of cell-phone they used. The results are shown in the table.

Type of cellphone	Boys	Girls	Total
Brand A	48	52	**100**
Brand B	40	34	**74**
Brand C	32	30	**62**
Total	**120**	**116**	**236**

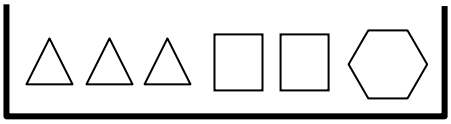
(a) Are the events "Boy" and "Brand A cell-phone" mutually exclusive? Justify your answer. (2)

(b) Prove that the events "Boy" and "Brand A cell-phone" are **dependent**. (4)

6 marks

Question 4

A box contains 3 triangles, 2 squares and 1 hexagon.



Each of the 6 objects has an equal chance of being selected at random from the box.

An object is selected at random, **NOT REPLACED**, and then a second object is selected at random.

(a) Represent this selection process in a tree diagram, clearly indicating all probabilities in simplest fraction form. (6)

(b) Use your probability tree (or otherwise) to calculate the probabilities of the following (in simplest fraction form):

(1) of drawing a hexagon **and** then a triangle (1)

(2) of drawing two identical shapes (2)

9 marks

Question 5

State whether the following statements are true (T) or false (F):

(a) If the mean is greater than the median, the data tend to be positively skewed. (1)

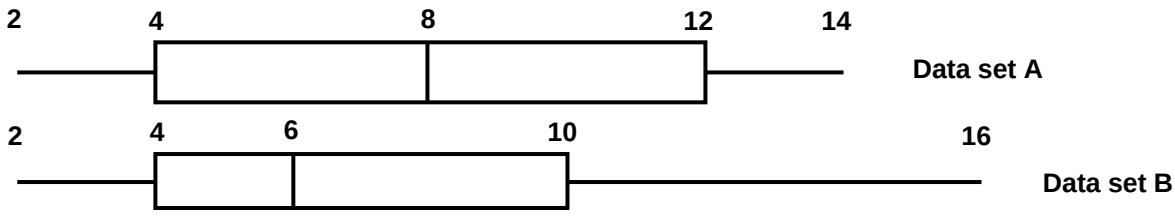
(b) The median is NOT influenced by outliers. (1)

(c) The 50^{th} percentile is also called the mean. (1)

(d) If the data are negatively skewed, most of the data lie to the left of the median. (1)

4 marks

Question 6



The box-whiskers diagrams of two sets of data – A and B – are shown above.

The extreme values of Set A are 14 and 2, and in B 16 and 2. They both have the same lower quartile.

(a) Which data set is the most symmetrical? (1)

(b) Which data set has the larger interquartile range? (1)

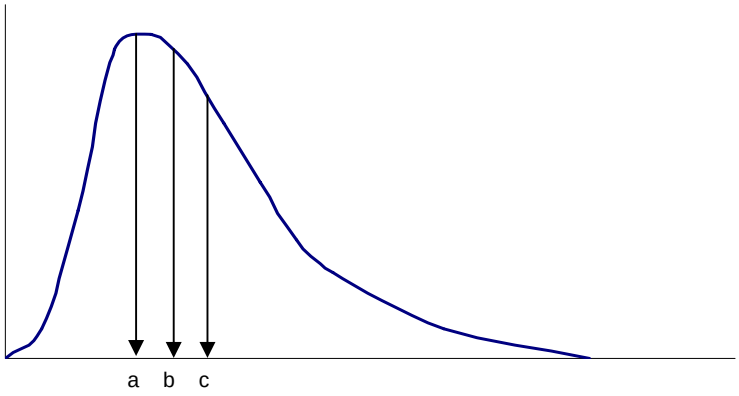
(c) Is data set B skewed left (L) or right (R)? (1)

(d) Which data set has the larger standard deviation? (1)

Explain your answer. (2)

6 marks

Question 7



Match each of the values a, b and c with one of the following measures of central tendency

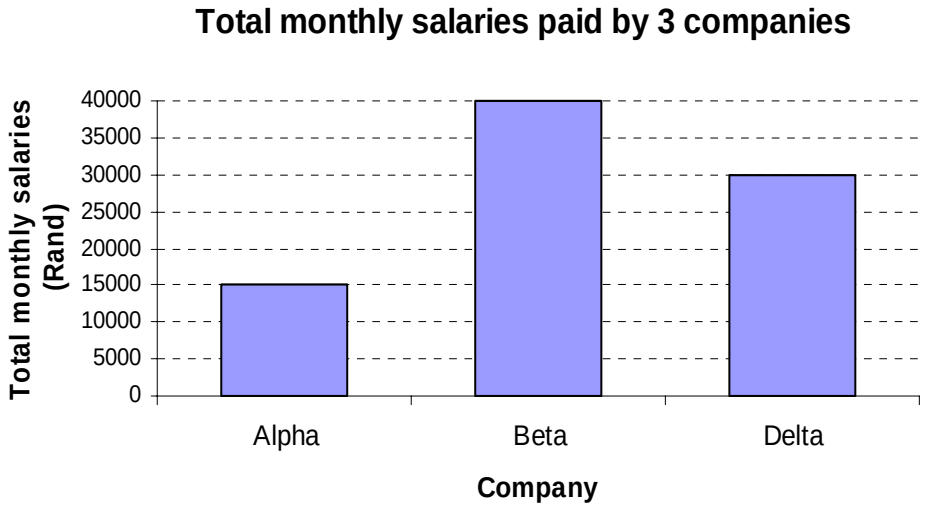
mean ☐

median ☐

mode ☐ (3)

3 marks

Question 8

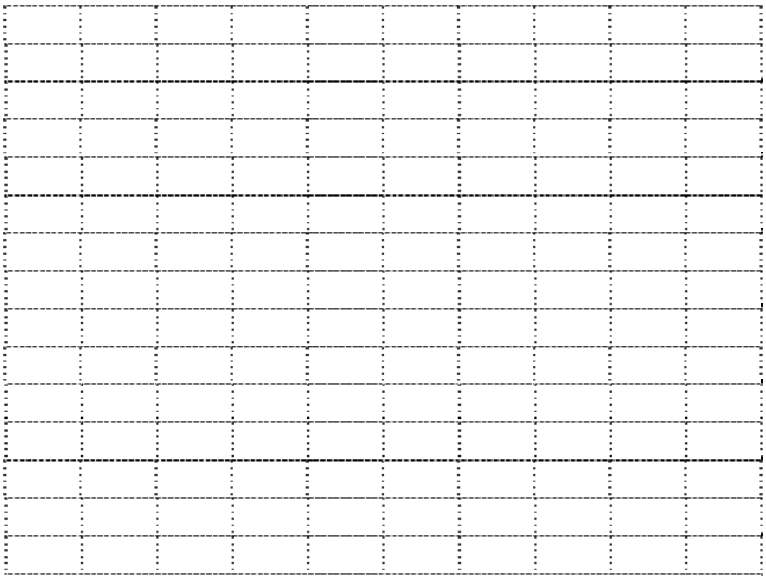


The **total** amount of money that 3 companies pay each month to their employees is shown in the bar-chart.

(a) Is the information in the diagram sufficient to indicate which company tends to pay it's employees more? Justify your answer. (2)

(b) Alpha Company has 10 employees, Beta Company has 40 employees and Delta Company has 15 employees. At which company is the average monthly salary the highest? (2)

(c) Represent the data more accurately.

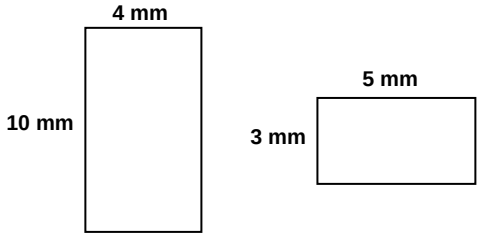


(4)

8 marks

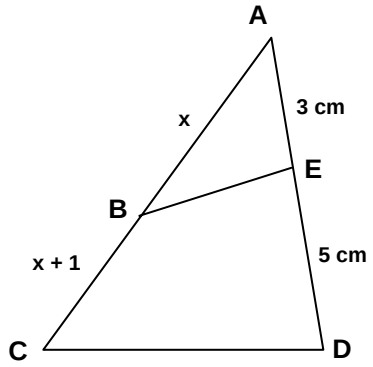
Question 9

(a) Two rectangles are shown. Explain whether the rectangles are similar OR not, giving a reason for your answer. (2)



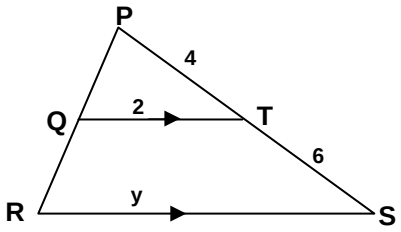
(b) "Two right-angled triangles both have a hypotenuse 10 cm long, thus they are similar." Is this statement True? Give a reason for your answer. (2)

(c)



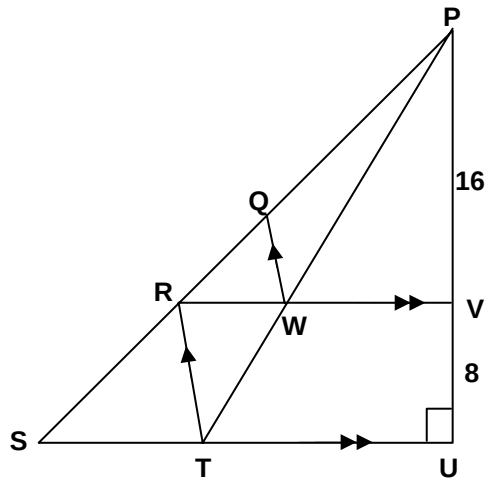
In the diagram, which is not drawn to scale, is it possible for BE to be parallel to CD? Explain your answer. (3)

(d) Find the value of y. [Hint: write down, without reason, 2 similar triangles.] (3)



10 marks

Question 10



In the figure, RV || STU and QW || RT.

PV = 16 mm and UV = 8 mm. $\hat{U} = 90°$.

(a) Write down the value of the following, **without reasons**

(1) $\frac{PW}{WT}$ (1)

(2) $\frac{RV}{SU}$ (1)

(3) $\frac{PR}{RS}$ (1)

(4) $\frac{PQ}{QS}$ (2)

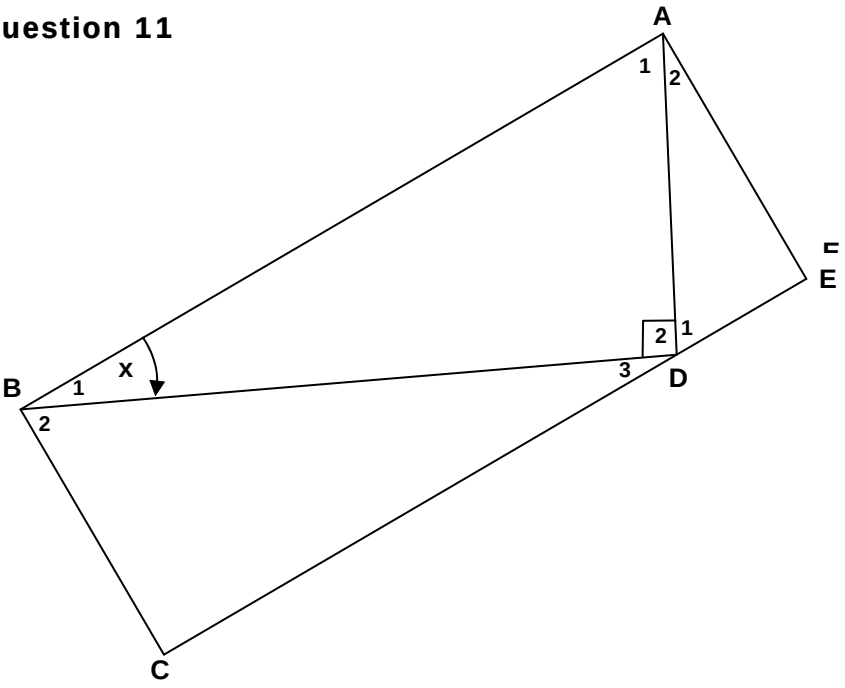
(b) Name a triangle that is

(1) similar to ΔPWV (2)

(2) similar to ΔQRW (2)

9 marks

Question 11



(a) Find, **giving reasons**, the size of each of the following angles **in terms of x**.

(1) $B\hat{D}C$ (2)

(2) $A\hat{D}E$ (2)

(b) Prove that

(1) $\Delta ADB \,|||\, \Delta DEA$ (3)

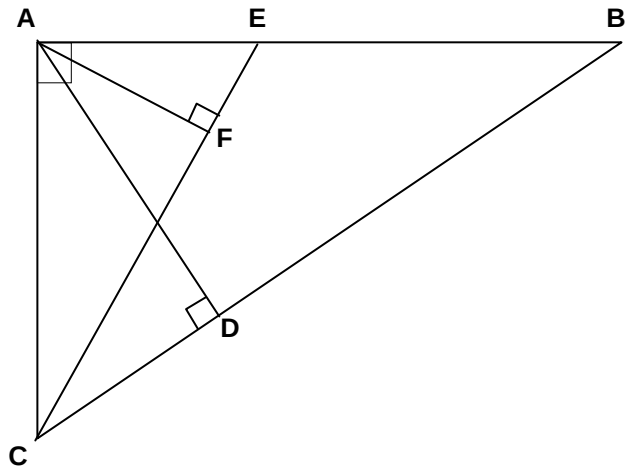
(2) and hence that $AD^2 = AB.DE$ (1)

(c) If it is further **GIVEN** that $\Delta ADB \,|||\, \Delta BCD$ **(you do not have to prove this)** write down an expression for BD^2. (1)

(d) If $\frac{CD}{DE} = \frac{9}{1}$ find the value of $\frac{BD}{AD}$. [Hint: use your expressions from and (c).] (3)

12 marks

Question 12



(a) Prove that $\frac{CD}{CE} = \frac{CF}{CB}$ (5)

(b) If CF = 8 cm, CE = 10 cm and CD = 4 cm, find the length of

(1) DB (3)

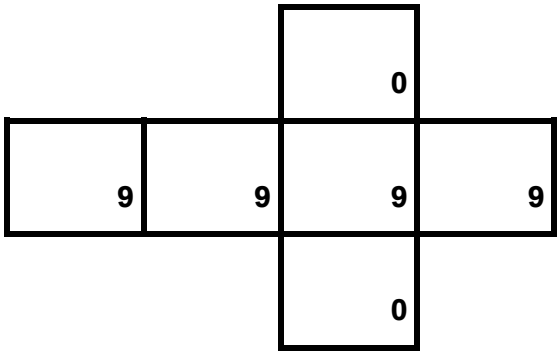
(2) AB (to 1 decimal place) (3)

11 marks

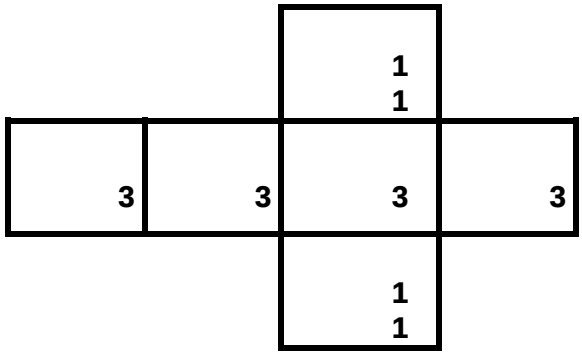
Question 13

The nets of 2 fair dice are shown below.

DIE A



DIE B



Two players are going to play a game with the dice. The 1st player selects a die and rolls it once. The 2nd player rolls the other die once. The winner is the player with the highest score.

(a) Suppose you are the 1st player. Which die would you select in order to maximize your chance of winning? Clearly justify your answer. (6)

(b) Suppose the player using Die A wins R45 each time he/she wins a game. How much should the player using Die B receive when he/she wins if the game must be **fair**. A "fair game" is a game in which both players end up with the same winnings after a large number of games. (3)

9 marks

[Total: 100 marks]