MATHEMATICS

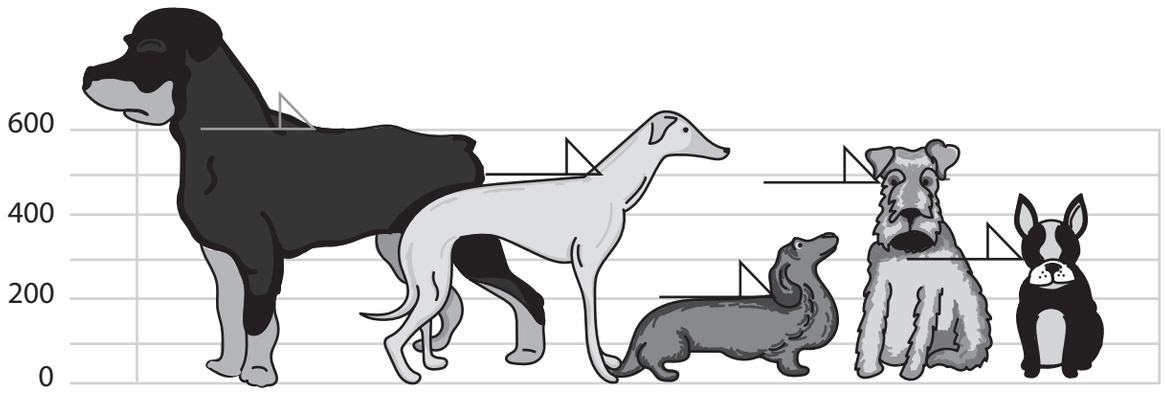
RESOURCE PACK

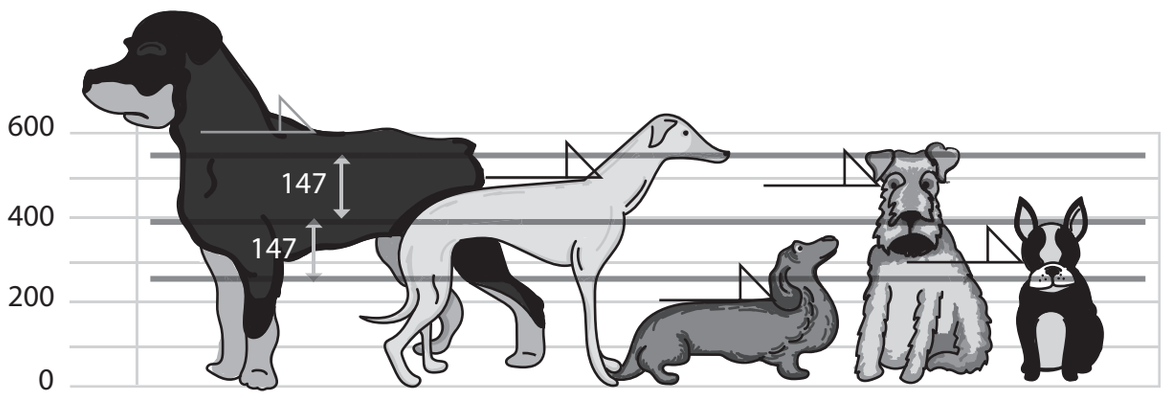
GRADE 12 TERM 3

STATISTICS

RESOURCE 1

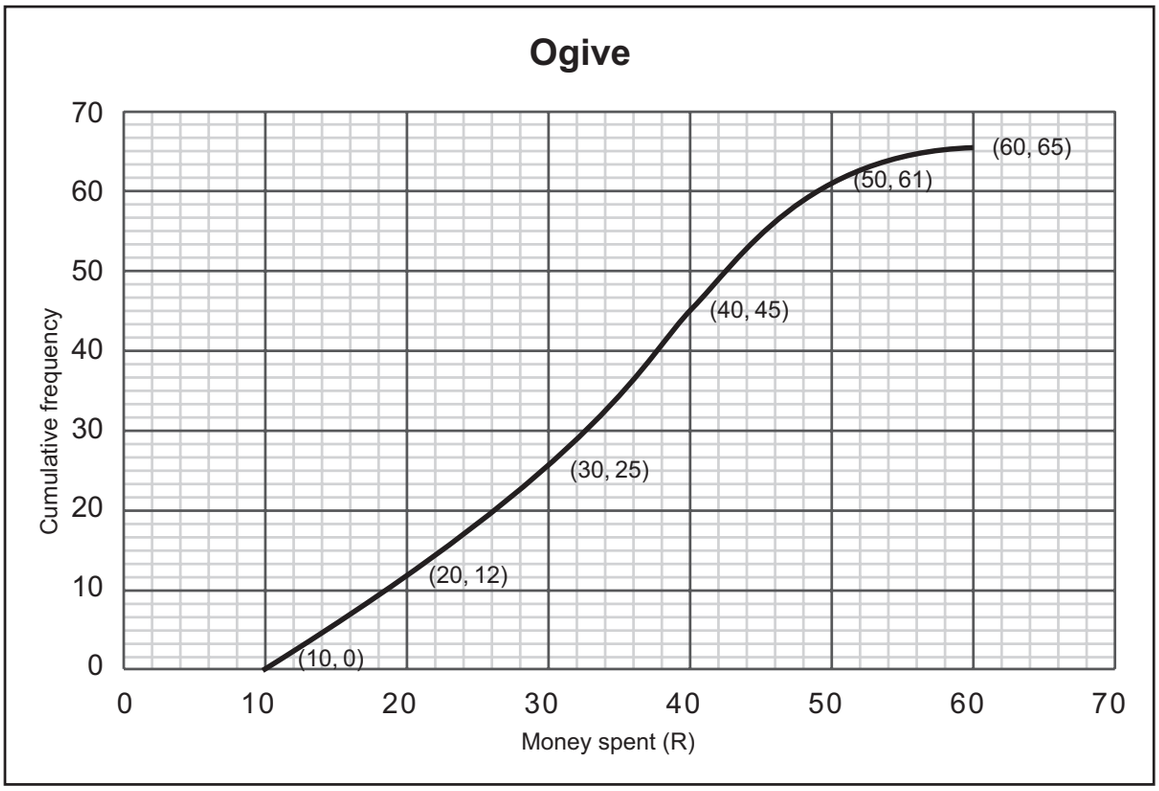
TOPIC 1 LESSON 1

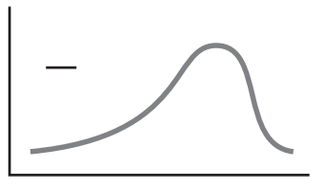
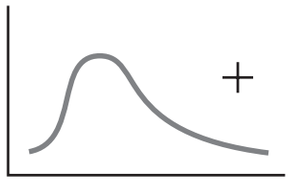
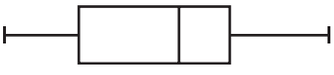
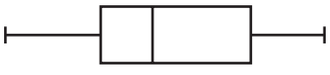




RESOURCE 2

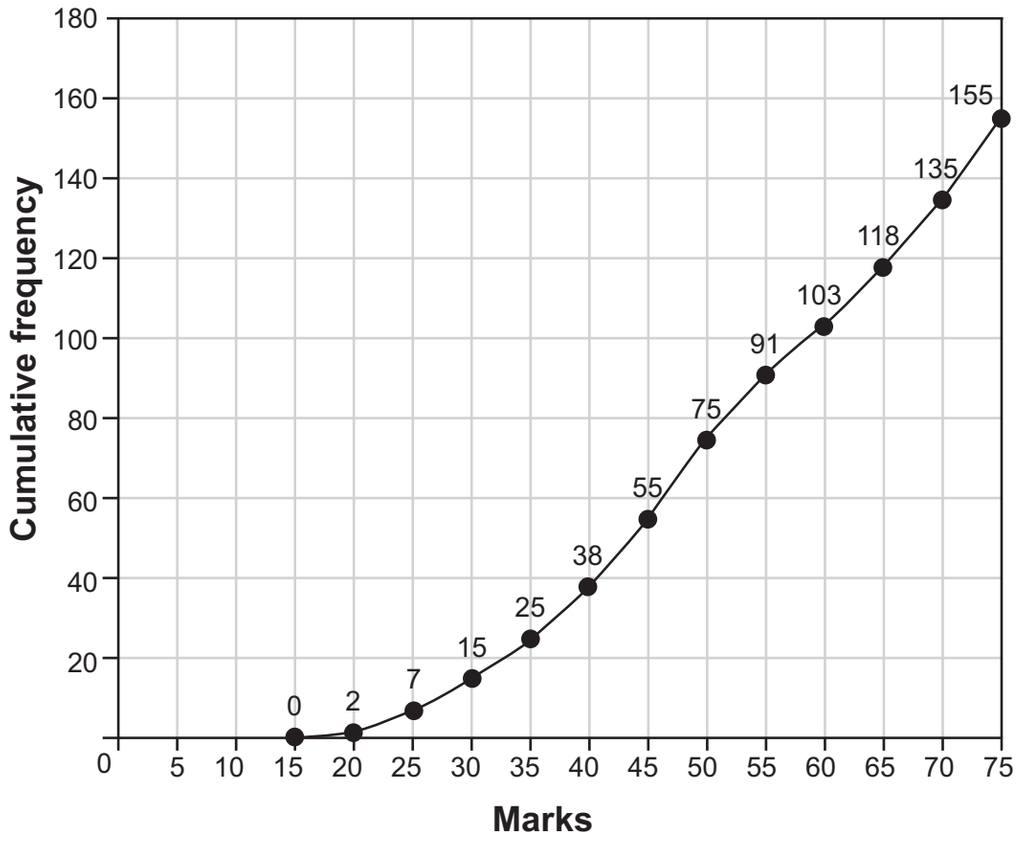
TOPIC 2 LESSON 1



	
(Longer tail on <u>left</u> = skewed to left)	(Longer tail on <u>right</u> = skewed to the right)
	
Skewed to the <u>left</u> – the data is more spread out on the left	Skewed to the <u>right</u> – the data is more spread out on the right.

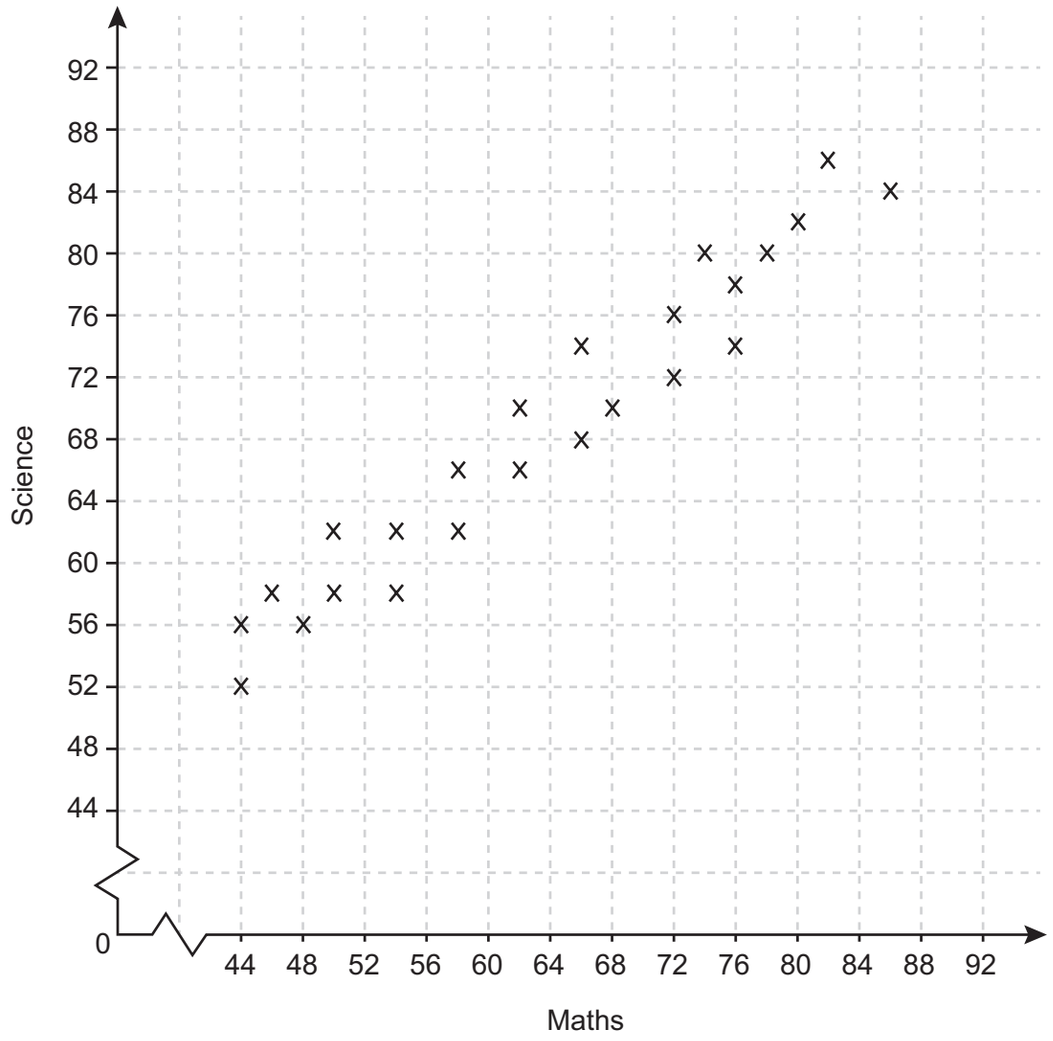
RESOURCE 3

TOPIC 2 LESSON 1



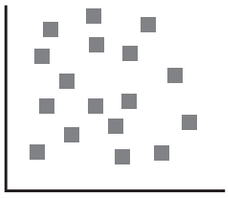
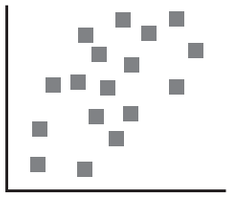
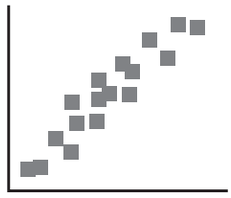
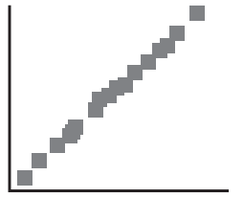
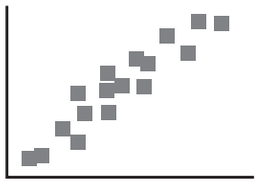
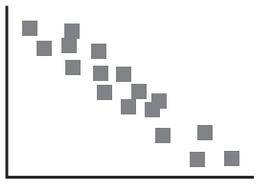
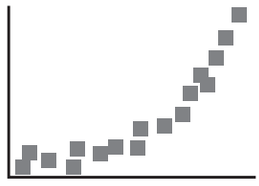
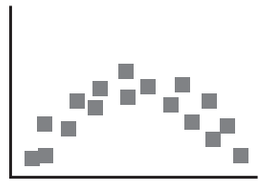
RESOURCE 4

TOPIC 2 LESSON 2



RESOURCE 5

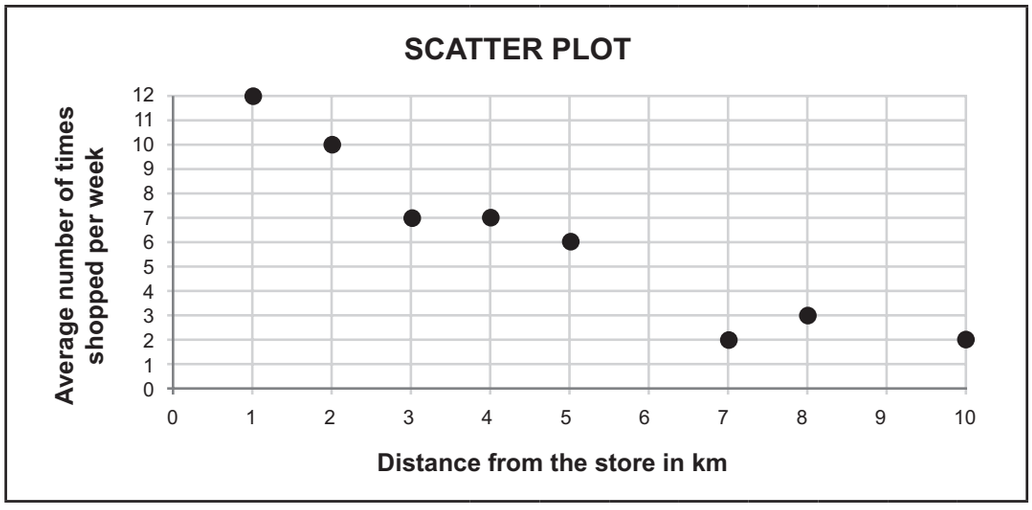
TOPIC 2 LESSON 2

Degree of correlation:			
No correlation	Weak correlation	Strong correlation	Perfect correlation
			
Type of correlation:			
Positive linear	Negative linear	Exponential	Curved (parabolic)
			

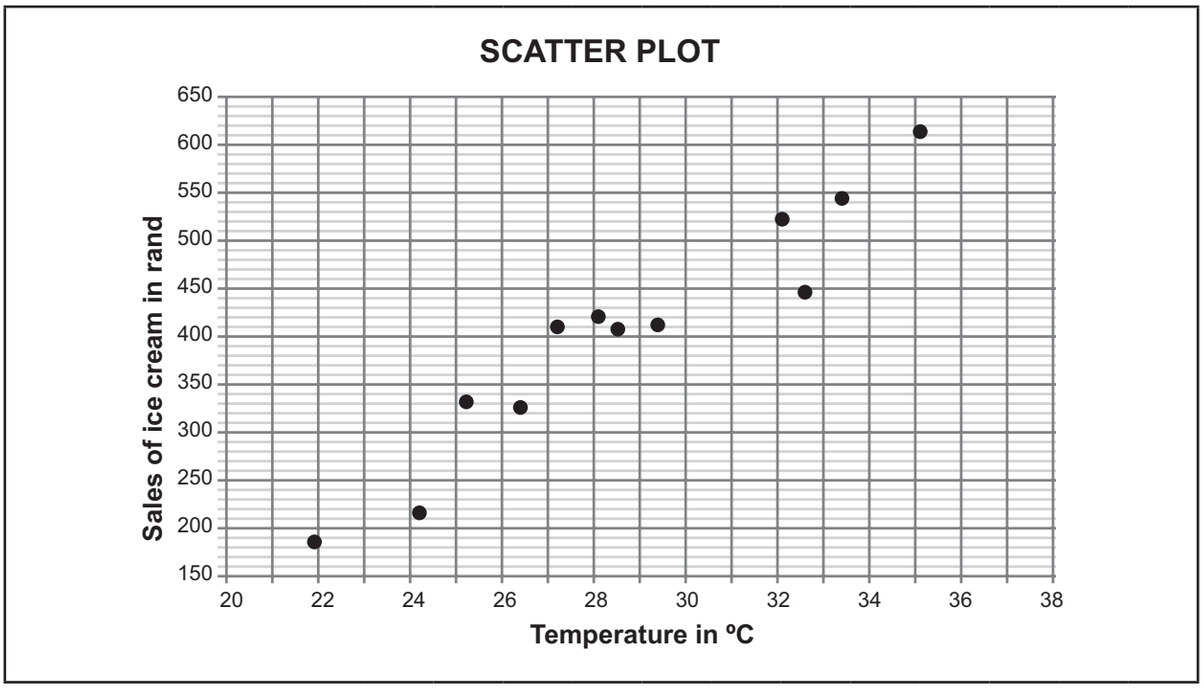
RESOURCE 6

TOPIC 2 LESSON 2

Distance from the store in km	1	2	3	4	5	7	8	10
Average number of times shopped per week	12	10	7	7	6	2	3	2



Temperature in ºC	24,2	26,4	21,9	25,2	28,5	32,1	29,4	35,1	33,4	28,1	32,6	27,2
Sales of ice cream in rand	215	325	185	332	406	522	412	614	544	421	445	408



RESOURCE 7

ASSESSMENT: TERM 3 TEST

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1 – 3	Euclidean Geometry	20	
4–5	Statistics	18	
6	Probability	12	
	TOTAL	50	

INSTRUCTIONS AND INFORMATION

1. If necessary, round answers off to two decimal places.

2. Calculators may be used.

$$PA = \frac{n(A)}{n(S)}$$

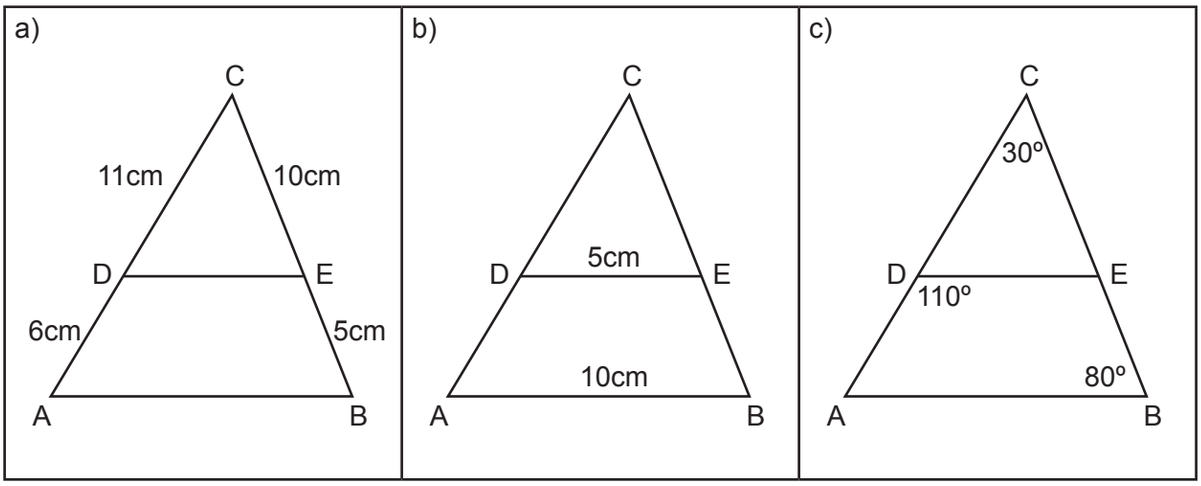
$$P(A \text{ or } B) = P(A) + P(B) = P(A \text{ and } B)$$

$$\overline{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^{n} (x_i - \overline{x})^2}{n}$$

QUESTION 1 **6 MARKS**

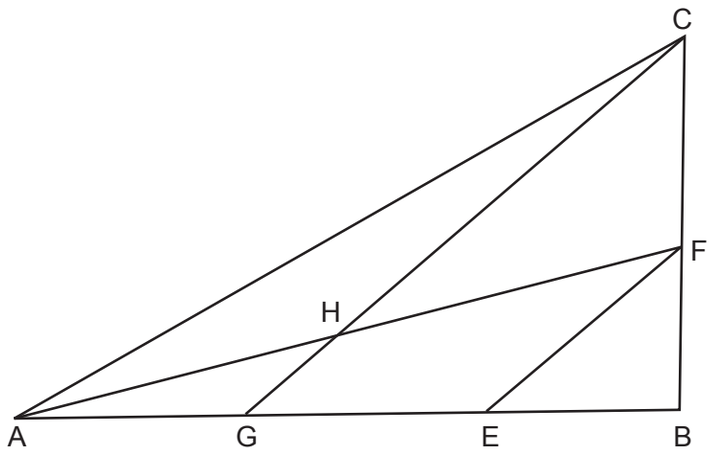
In each case state whether $\Delta ABC \,|||\, \Delta DEC$ or not. Give a reason for your answer.



QUESTION 2 **7 MARKS**

In ΔABC it is given that:

- $EF \,||\, GC$.
- $AH:HF = 2:3$
- $AG:GB = 1:4$

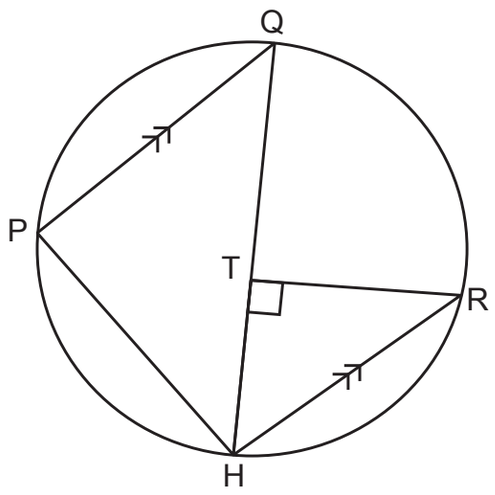


Determine $CF:FB$

QUESTION 3 **7 MARKS**

QS is the diameter of circle $PQRS$, $PQ \parallel SR$, and $R\hat{T}S = 90°$.

Prove that $PQ.TR = PS.TS$



QUESTION 4 **6 MARKS**

A group of students wrote a statistics test and the following data was obtained:

Std deviation	8
Mean	72
Median	64

a) Is the data skewed? If so, in which direction? Give a reason for your answer. (3)

b) The teacher found that one question was not clear and not possible to calculate the answer. For this reason, it was decided to add 5 marks to each learner's result. For the new set of marks, write down the:

(i) Mean

(ii) Standard deviation

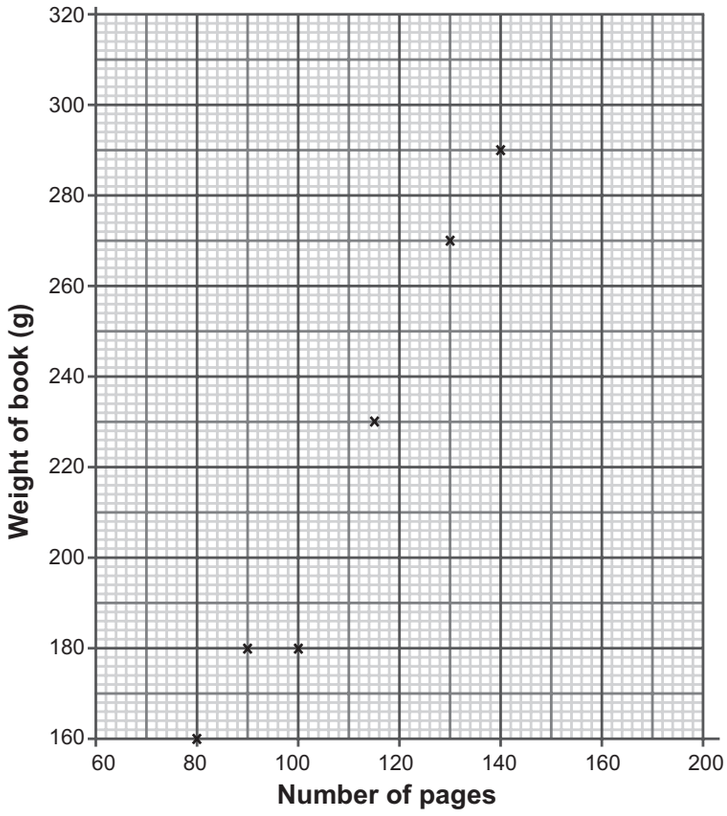
(iii) median (3)

QUESTION 5 **12 MARKS**

The table below shows the number of pages and the weight, in grams, for each of 10 books.

Number of pages	80	130	100	140	115	90	160	140	105	150
Weight (g)	160	270	180	290	230	180	320	270	210	300

The first 6 points have been plotted on a scatter plot representing the information:



a) Complete the scatter plot. (3)

b) For these books, describe the relationship between the number of pages and the weight of a book. (1)

c) Calculate the correlation coefficient of the data. (1)

d) Calculate the equation of the least squares regression line. (3)

e) Use the equation found in (d) to estimate:

(i) The weight of a book with 125 pages

(ii) The weight of a book with 350 pages. (4)

f) Which of the two answers above would you have more confidence in? Give a reason for your answer. (2)

QUESTION 6 **12 MARKS**

a) Your parents are going to buy a new television set. You join them to go shopping. In the shop, they are given the following options:

Plasma or LCD
HD ready, Full HD or UHD
19", 24", 32", 40" or 52"

(i) How many different television sets are available to your parents? (2)

(ii) They know already that they want a 40", how many options do they have now? (1)

b) The standard configuration for a New York license plate is 3 digits followed by 3 letters.

(i) How many different license plates are possible if digits and letters can be repeated? (2)

(ii) How many different license plates are possible if digits and letters cannot be repeated? (2)

(iii) What is the probability that the number is larger than 600 if the rule in (ii) applies? (3)

c) Your mathematics teacher has just received 5 new posters for the classroom. In how many ways could she line them up on the back wall? (2)

RESOURCE 8

ASSESSMENT: TERM 3 TEST MEMORANDUM

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1 – 3	Euclidean Geometry	20	
4–5	Statistics	18	
6	Probability	12	
	TOTAL	50	

INSTRUCTIONS AND INFORMATION

1. If necessary, round answers off to two decimal places.

2. Calculators may be used.

3. Formulae:

$$PA = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) = P(A \text{ and } B)$$

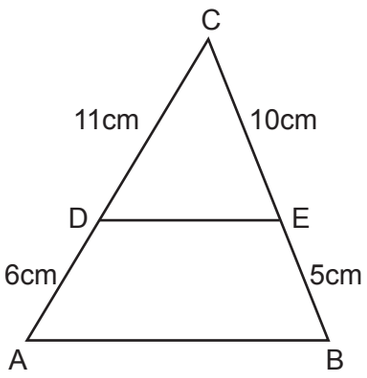
$$\overline{x} = \frac{\sum x}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^{n} (x_i - \overline{x})^2}{n}$$

QUESTION 1 **6 MARKS**

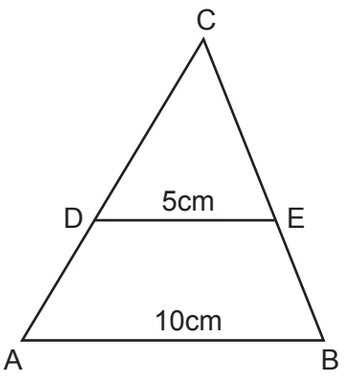
In each case below, state whether $\Delta ABC|||\Delta DEC$ or not. Give a reason for your answer.

a)



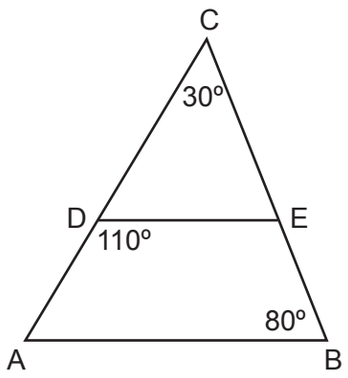
No ✓,
sides are not in proportion
$\frac{11}{17} \neq \frac{10}{15}$ ✓

b)



No ✓,
even though $AB=2DE$,
midpoint theorem doesn't apply since the sides aren't congruent ✓

c)



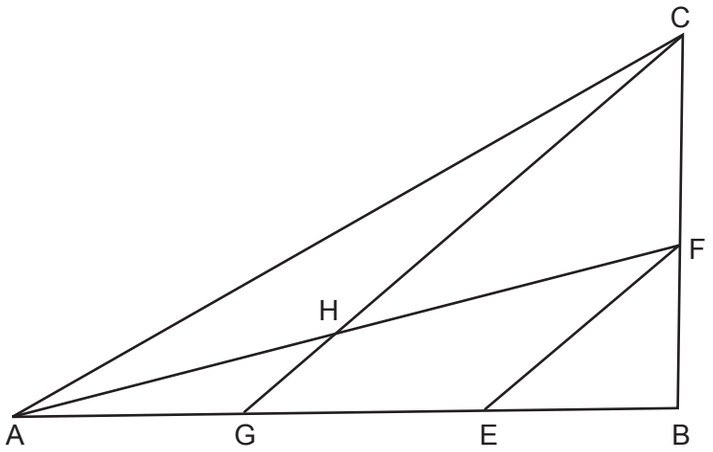
Yes ✓,
all corresponding angles in both triangles are congruent ✓

(6)

QUESTION 2 **7 MARKS**

In ΔABC it is given that:

- $EF||GC$.
- $AH:HF=2:3$
- $AG:GB=1:4$



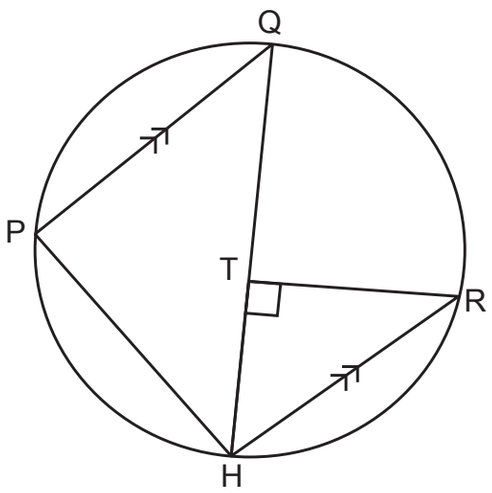
Determine $CF:FB$

Statement	Reason
$\frac{AG}{GE} = \frac{AH}{HF}$ ✓	Line || one side of ΔABF ✓
$\frac{1k}{GE} = \frac{2p}{3p}$	
$GE = \frac{3}{2}k$ ✓	
$GE + EB = GB$	
$\frac{3}{2}k + EB = 4k$	
$EB = \frac{5}{2}k$ ✓	Line || one side of ΔABF ✓
$\frac{CF}{FB} = \frac{GE}{EB}$ ✓	
$\frac{CF}{FB} = \frac{\frac{3}{2}k}{\frac{5}{2}k}$	
$CF:FB = 3:5$ ✓	

QUESTION 3 **7 MARKS**

QS is the diameter of circle PQRS, PQ||SR, and $R\hat{T}S = 90°$.

Prove that $PQ.TR = PS.TS$



Statement	Reason	
In $\Delta P\hat{Q}S \|\|\| \Delta T\hat{S}R$		
$R\hat{T}S = 90°$	Given	
$S\hat{P}Q = 90°$	Angle in a semi-circle	✓
$\therefore S\hat{P}Q = R\hat{T}S$		✓
$P\hat{Q}S = T\hat{S}R$	Alternate Angles ($PQ \|\| SR$)	✓
$P\hat{S}Q = T\hat{R}S$	Sum of angles of Δ	✓
$\therefore \Delta PQS \|\|\| \Delta TSR$	AAA	✓
$\therefore \frac{PQ}{TS} = \frac{PS}{TR}$	Corresponding sides of Δ's in proportion	✓
$PQ.TR = PS.TS$		✓

QUESTION 4 **6 MARKS**

A group of students wrote a statistics test and the following data was obtained:

Std deviation	8
Mean	72
Median	64

a) Is the data skewed? If so, in which direction? Give a reason for your answer.
Yes ✓, the mean > median ✓ ∴ positively skewed ✓ (3)

b) The teacher found that one question was not clear and not possible to calculate the answer. For this reason, it was decided to add 5 marks to each learner's result.
For the new set of marks, write down the:

(i) Mean 77 ✓

(ii) Standard deviation 8 ✓

(iii) median 69 ✓ (3)

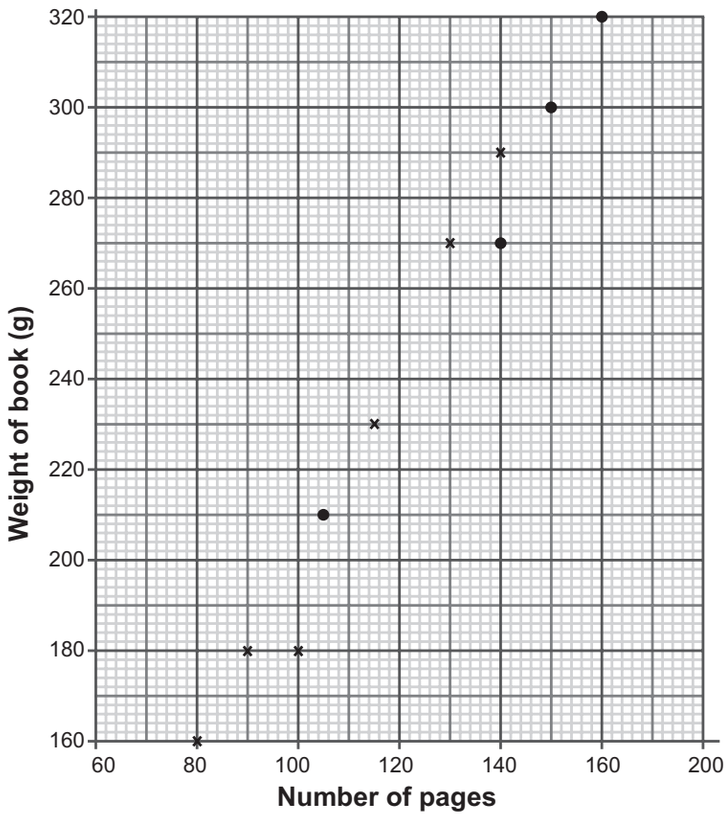
QUESTION 5 **12 MARKS**

The table below shows the number of pages and the weight, in grams, for each of 10 books.

Number of pages	80	130	100	140	115	90	160	140	105	150
Weight (g)	160	270	180	290	230	180	320	270	210	300

The first 6 points have been plotted on a scatter plot representing the information:

a) Complete the scatter plot. (3)



✓✓✓

b) For these books, describe the relationship between the number of pages and the weight of a book.
The more pages a book has the higher the weight is. ✓ (1)

c) Calculate the correlation coefficient of the data.
0,8624 ✓ (1)

d) Calculate the equation of the least squares regression line.
$y = 14{,}72 + 1{,}787x$ ✓ ✓ ✓ (3)

e) Use the equation found in (d) to estimate:

(i) The weight of a book with 125 pages
238,095g ✓ ✓

(ii) The weight of a book with 350 pages.
640,17g ✓ ✓ (4)

f) Which of the two answers above would you have more confidence in?
Give a reason for your answer.
The first one as it is within the data range (interpolation). ✓
The second one is extrapolating and therefore may not be reliable. ✓ (2)

QUESTION 6 **12 MARKS**

a) Your parents are going to buy a new television set. You join them to go shopping. In the shop, they are given the following options:

Plasma or LCD
HD ready, Full HD or UHD
19", 24", 32", 40" or 52"

(i) How many different television sets are available to your parents?
2 × 3 × 5 = 30 ✓✓ (2)

(ii) They know already that they want a 40", how many options do they have now?
2 × 3 = 6 ✓ (1)

b) The standard configuration for a New York license plate is 3 digits followed by 3 letters.

(i) How many different license plates are possible if digits and letters can be repeated?

$10^3 \times 26^3$ ✓= 17 576 000 ✓ (2)

(ii) How many different license plates are possible if digits and letters cannot be repeated?

10 × 9 × 8 × 26 × 25 × 24 ✓= 11 232 000 ✓ (2)

(iii) What is the probability that the number is larger than 600 if the rule in (ii) applies?

$n(S) = 10 \times 9 \times 8 = 720$

$n(E) = 4 \times 9 \times 8 = 288$

$P(E) = \frac{288}{720}$ ✓✓ $= \frac{2}{5}$ ✓ (3)

c) Your mathematics teacher has just received 5 new posters for the classroom. In how many ways could she line them up on the back wall?

5! ✓= 120 ✓ (2)

GRADE 10 Test 1					
Question	**Knowledge**	**Routine**	**Complex**	**Problem Solve**	
1 a-c	6				
2			7		
3			7		
4a		3			
4b				3	
5a	1				
5b		1			
5c		1			
5d		3			
5e	4				
5f			2		
6a		3			
6b (i)		2			
6b (ii)		2			
6b (iii)				3	
6c		2			
Totals	11	17	16	6	50