HILLCREST HIGH SCHOOL

Grade 9 Mathematical Exam

Geometry

November 2018

Examiner: Mr. Hopkins Moderator: Mrs. Woodrow

MARKS: 100 TIME: 2 hours

INSTRUCTIONS

1. Write your name and your teacher's name on your answer book.
2. This question paper consists of 6 questions. Answer ALL the questions.
3. Number the questions correctly according to the number system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations and steps clearly.
7. Round off ALL final answers to TWO decimal places, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless otherwise stated.

QUESTION 1

1.1 Complete (fill in the missing word):

1.1.1 A quadrilateral with equal diagonals and adjacent sides equal is called a _____ (1)

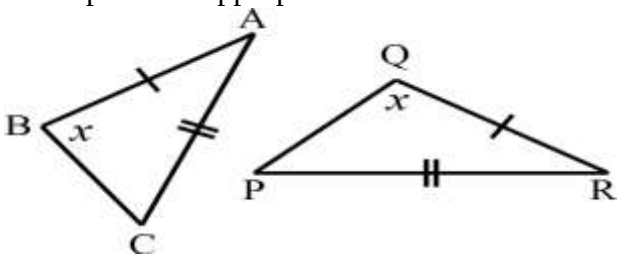
1.1.2 A quadrilateral in which just one diagonal bisects the other is a _____ (1)

1.2 The minute hand of a church clock is 30 cm long and the hour hand is 16 cm long.

1.2.1 Find the distance between the tips of the hands at 3 o' clock. (3)

1.2.2 Calculate the size of the **reflex** angle between the hands of the clock at 3 o'clock. (1)

1.3 Are the following pairs of triangles congruent?
Complete the appropriate statement. (2)



$\Delta ABC \equiv$ Reason: ( )

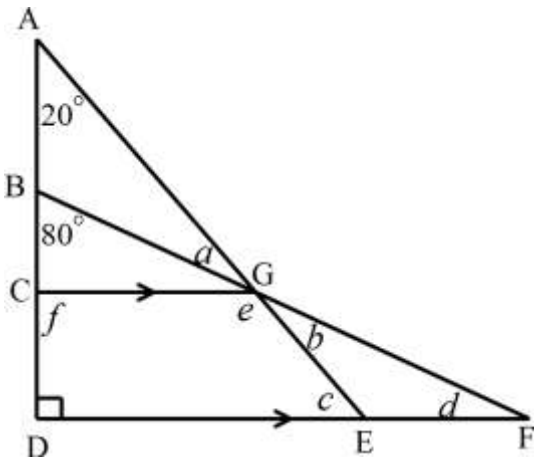
or

The triangles are not congruent because …….

[8]

QUESTION 2

AGE and BGF are straight lines. Determine the sizes of the angles marked a to f in this order, giving reasons.



a = _____ (_____)

b = _____ (_____)

c = _____ (_____)

d = _____ (_____)

e = _____ (_____)

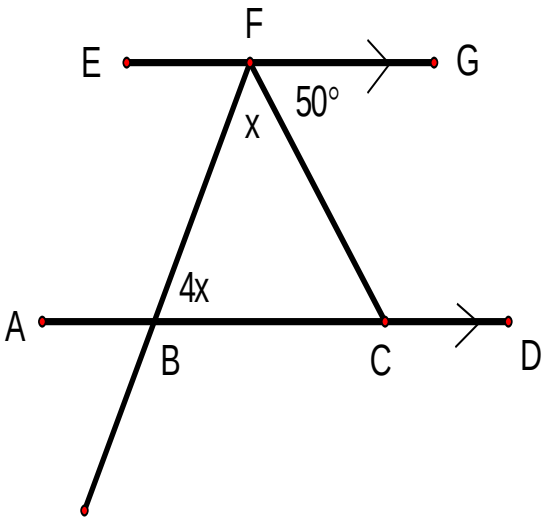
f = _____ (_____)

[12]

QUESTION 3

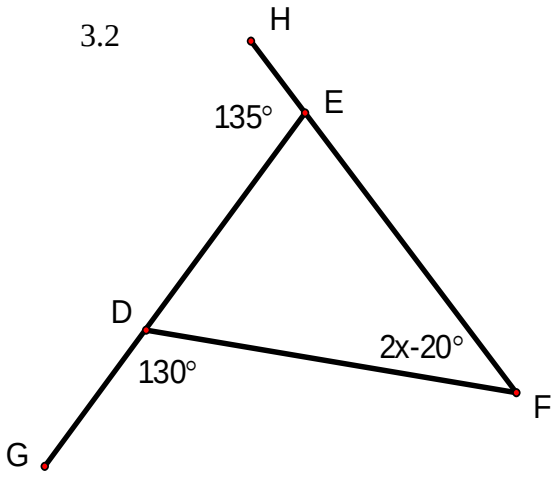
Using the following diagrams, form an equation to determine the value of x: Include reasons for each statement.

3.1



(3)

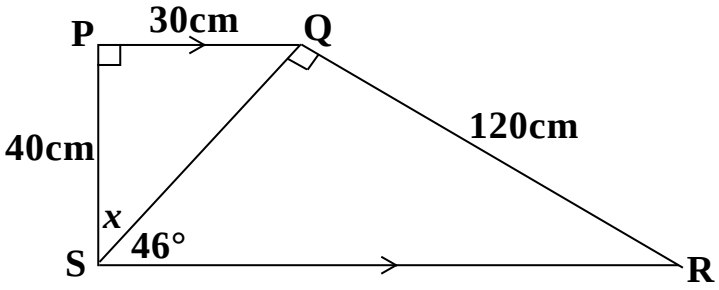
3.2



(3)
(6)

QUESTION 4

Given quadrilateral PQRS with PQ || SR . $\hat{P} = 90°$, $S\hat{Q}R = 90°$ and $Q\hat{S}R = 46°$.
PQ = 30cm, PS = 40cm and QR = 120cm.



4.1 Determine the value of *x*, giving reasons. (2)

4.2 Name the quadrilateral PQRS (i.e.: name the shape),

_____ (1)

4.3 Determine the length of SQ, including all reasons and working. (3)

Length of SQ

4.4 Determine the length of SR, including all reasons and working. (3)

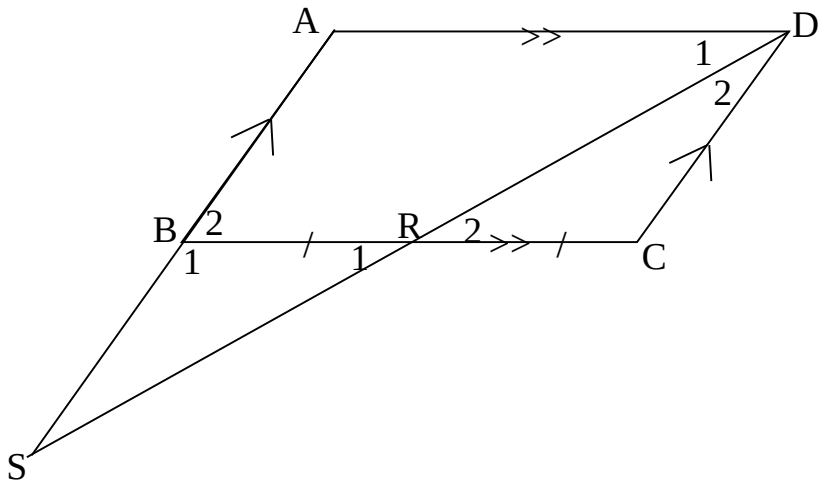
Length of SR

4.5 Determine the area of Quadrilateral PQRS. (3)

[12]

QUESTION 5

In the sketch below: AD//BC, SA//CD and BR = RC.

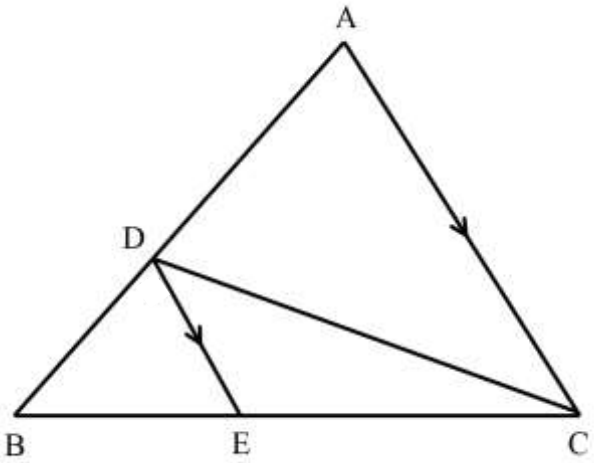


5.1 Prove that $\Delta BRS \equiv \Delta CRD$ (Include all statements and reasons) (4)

(4)

QUESTION 6

In ΔABC, DE || AC



6.1 Prove ΔBDE ||| ΔBAC (4)

6.2 If DB = 3 cm, BE = 2cm and DC = 8 cm, find the length of EC. (4)

[8]

QUESTION 7

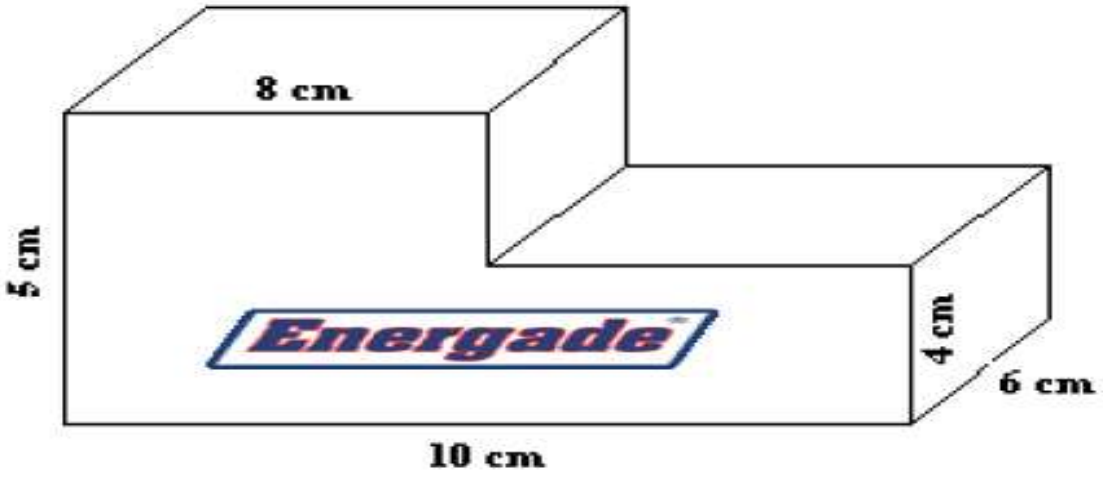
7.1 You have organised a cycling event that will require you to supply beverages to the cyclists. Read the following information and answer the questions. Use a value of 3.142 as PI.

7.1.1 Energade is served in cylindrical cups with a **diameter** of 8 cm and a height of 9.9 cm. Calculate the **volume** of liquid that can be contained in the cup. **Round your answer off to the nearest cubic centimetre.** (4)

7.1.2 If 1 millilitre is equal to $1cm^3$, calculate approximately how many cups can be poured from a 1,5 litre bottle. (3)

7.1.3 The organisers estimate that 13 000 litres of Energade will be used on the day. How many cups should they order? (Use your rounded off answer from 7.1.1 to answer this question) (2)

7.1.4 The cups are being transported in boxes that have the shape below. What is the **surface area** of the box? (3)



7.2 The distance from the centre of your bicycle wheel to the outer edge of your tyre is 35 cm.

7.2.1 Calculate the circumference of your bicycle wheel (1)

7.2.2 Approximately how many times will the wheel turn in 1 km? (3)

[16]

QUESTION 8

The following data are the masses (in kg) of the players in the current Springbok Rugby Squad.

86	91	94	95	95	95	102	102
103	103	105	105	108	110	110	112
114	116	120	121	122	122	125	128

8.1 Determine the range of the masses (in kg). (2)

8.2 Determine the following:

8.2.1 mode _____ (1)

8.2.2 median _____

_____

_____ (3)

8.2.3 mean _____

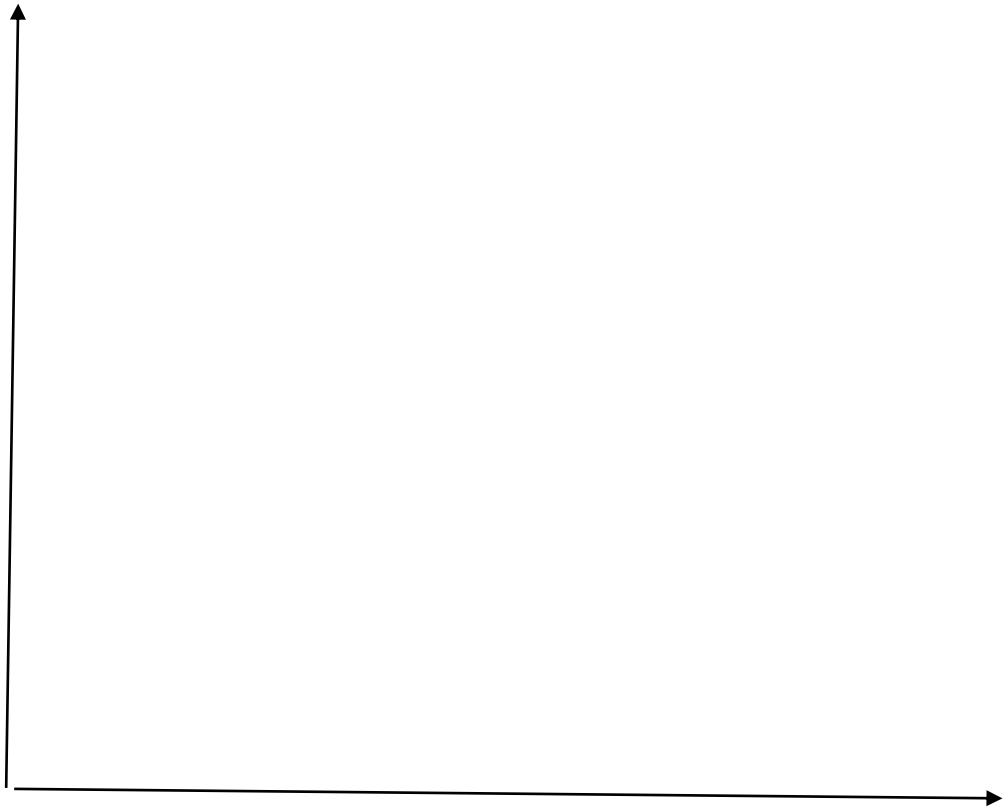
_____

_____ (3)

8.3 Complete the following table: (2)

Class Interval (kg)	Tally	Frequency
80 – 89		
90 – 99		
100 – 109		
110 – 119		
120 – 129		

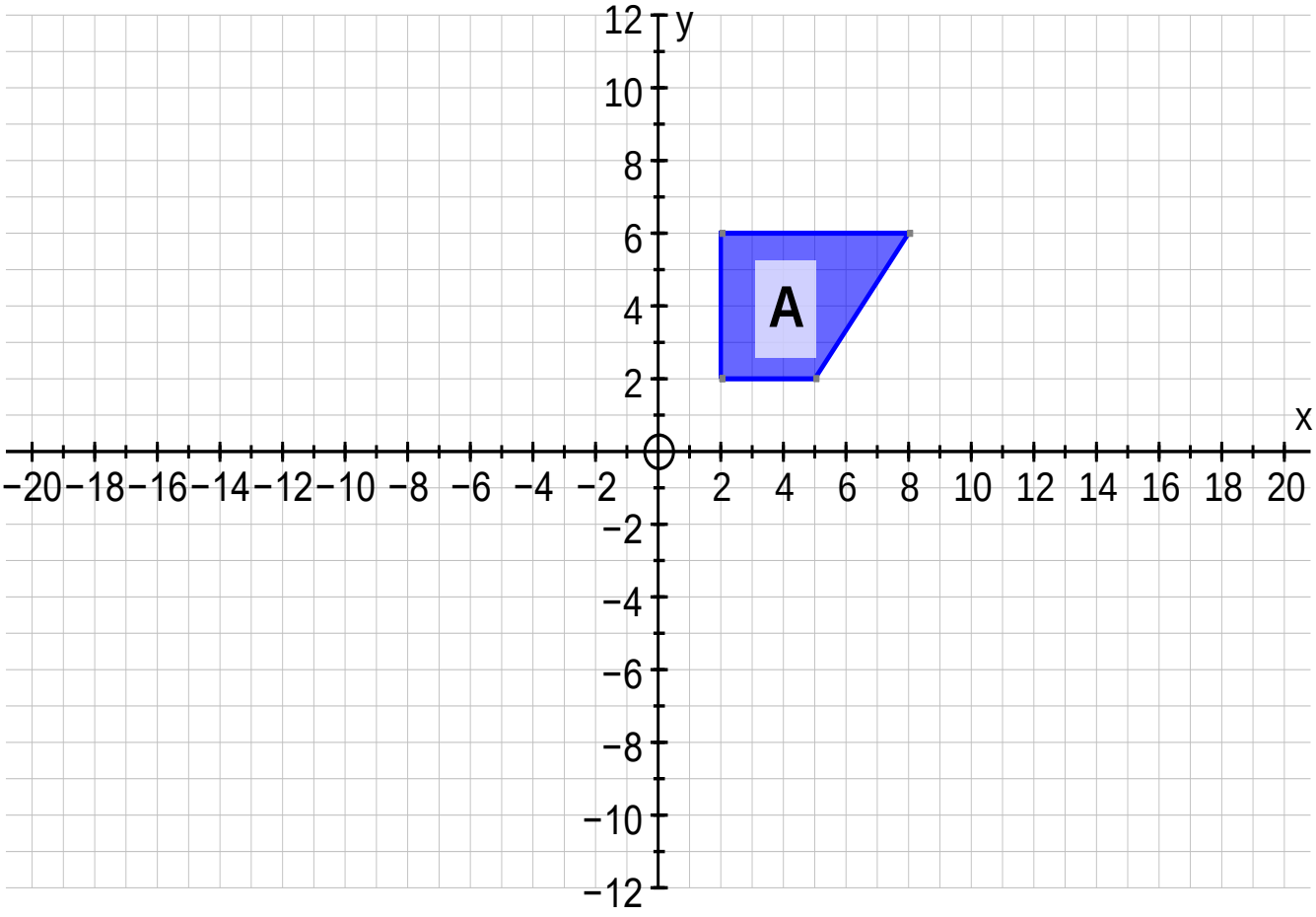
8.4 From the frequency table, draw a histogram of the data in the space below. Be sure to include all lables , measurements and a suitable heading. (5)



[16]

QUESTION 9

9.1 **Answer 9.1.2 and 9.1.3 on the grid below**



9.1.1 Write down the co-ordinates at each vertex of shape A. (2)

9.1.2 Reflect shape A over the line $y = -x$ and label the image, B. (2)

9.1.3 Write down the co-ordinates of all vertices of shape B. (2)

9.1.4 Translate shape A according to the following rule:

$(x; y) \rightarrow (x+4; y-5)$ and label this image C (2)

9.1.3 Write down the co-ordinates of all vertices of shape B. (2)

(10)

QUESTION 10

A Grade 9 class has won the class of the month award at their school. Each class member has the opportunity to order a pizza with the following combinations.

SIZE	BASE	TOPPINGS
Medium (M)	Normal (R)	Chicken (C)
Large (L)	Thick (T)	Pineapple (P)
		Ham and cheese (H)

10.1 Draw a tree diagram in the space below and show all the possible outcomes by using the abbreviations in the brackets. (3)

10.2 How many possible outcomes are there?

_____ (1)

10.3 Determine the probability that a student chosen at random will order a pizza with pineapple as a topping.

_____ (2)

10.3 Determine the probability that a student chosen at random will order a pizza with a normal base and pineapple as a topping.

_____ (2)

[8]

TOTAL: 100