

Annual Examinations for Secondary Schools 2022

YEAR 11

**MATHEMATICS
Main Paper**

TIME: 1h 40min

Question	1	2	3	4	5	6	7	8	9	10	11	12	Total Main	Non Calc	Global Mark
Mark															

DO NOT WRITE ABOVE THIS LINE.

Name: _____

Class: _____

**Calculators are allowed but all necessary working must be shown.
Answer ALL questions.**

1. a) What is the gradient of the line $y = 3x - 4$?

Ans: _____

- b) Write down the equation of the line which is parallel to $y = 3x - 4$ and has the same y-intercept as the line $2y = 7x + 10$.

Ans: _____

(3 marks)

2. a) Factorise completely by taking out the common factor:

i) $3x - 6$

ii) $9x^2 - 18x$

- b) Use both answers to part a) to simplify the fraction:

$$\frac{3x - 6}{9x^2 - 18x}$$

Ans: _____

(4 marks)

3. VAT on musical items is 18% of the cost price.

- a) i) The cost price of a set of headphones is €24.50.
How much VAT is to be paid?

Ans: _____

- ii) What is the price of the headphones including VAT?

Ans: _____

- b) The price of a guitar, including VAT, is €227.
What is the price before VAT is added?

Ans: _____

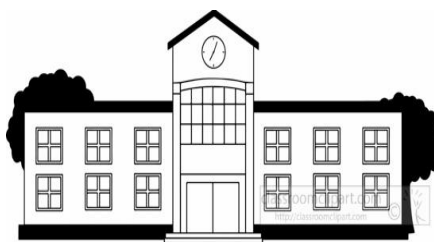
(6 marks)

4.

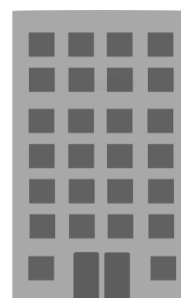
Diagrams NOT to scale



A



B



C

A, B and C are three buildings. A is x metres high. B is 3 metres higher than A.
C is twice as high as A.

- a) Fill in the blanks with an expression in terms of x :

i) Building B is _____ m high.

ii) Building C is _____ m high.

iii) What is the total height of the three buildings? Simplify your answer.

Ans: _____

- b) The actual total height of the three buildings is 25 m. Use the answer in part iii) to form an equation and solve it.

(6 marks)

5.

0.00005

0.0005

0.05

5 000

50 000

Choose from the numbers above to continue the statements below.
Use each number only once.

A spacecraft travels
at 5×10^3 m/s or ...



_____ m/s

A human hair has a
diameter of
 5×10^{-5} m or ...



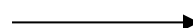
_____ m

The lowest
temperature ever
reached
in a lab is
 5×10^{-4} K or ...



_____ K

One mouse weighs
 1.63×10^{-2} kg.
Three mice roughly
weigh ...



_____ kg

A satellite travels at
 2.5×10^4 km/h.
Twice this speed
is...



_____ km/h

(5 marks)

6. a) i) The radius of a circle is $5r$ cm.

Show that the area A cm² of this circle is given by $A = 25\pi r^2$.

ii) Rearrange $A = 25\pi r^2$ to make r the subject of the formula.

Ans: $r =$ _____

b) A function is given by $f(x) = 2x - 7$.

i) Work out the value of $f(10)$.

Ans: _____

ii) What is the value of x when $f(x) = 6$?

Ans: $x =$ _____

iii) Another function is given by $g(x) = 5x + 2$.

Solve the equation $f(x) = g(x)$.

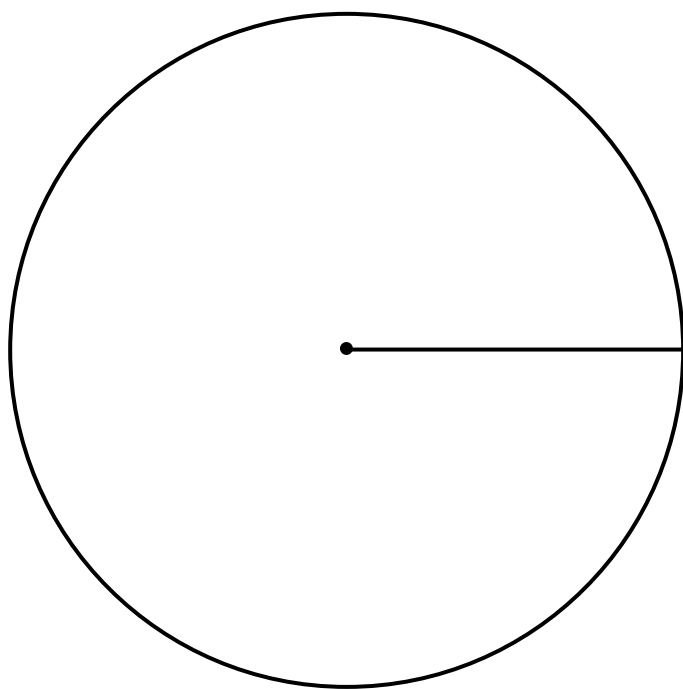
Ans: $x =$ _____

(8 marks)

7. The table shows the number of foreign pupils, by nationality, in Maltese state primary schools during the scholastic year 2014/15.

Nationality	Number of pupils
UK	190
Bulgaria	100
Italy	97
Syria	82
Libya	64

- a) Use the circle below to draw a pie chart representing this information. Round your angles to the nearest degree.



- b) A foreign pupil is chosen at random. What is the probability that the pupil is Bulgarian?

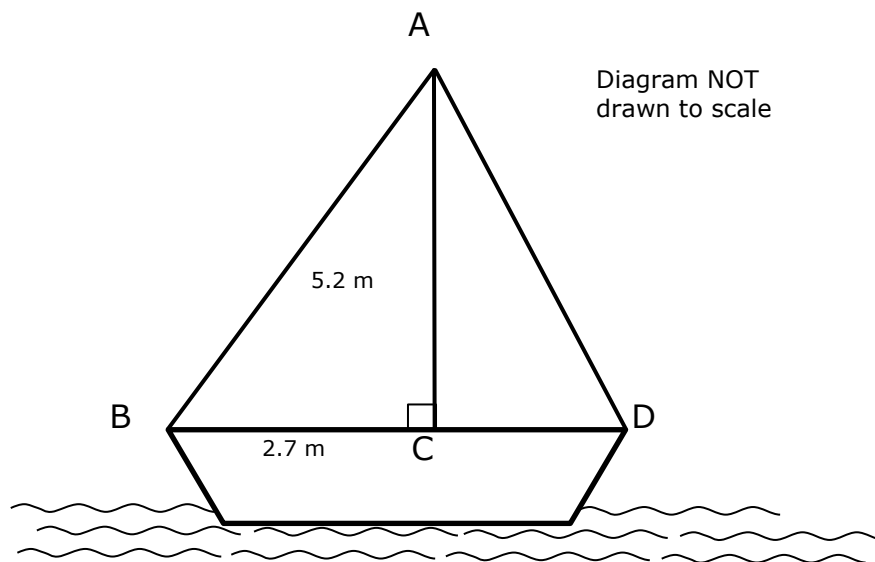
Ans: _____

- c) Complete: The number of pupils from _____ was almost three times the number of pupils from _____.

- d) In the scholastic year 2016/17, the number of pupils from Italy was 120. Julian says that the angle of the sector in the pie chart will be certainly larger. Is he right? Explain.

(9 marks)

8.



A sailing boat has a vertical mast AC, 5.2 m high. Points B and D on the boat are such that $\angle ACB = \angle ACD = 90^\circ$. $BC = 2.7$ m.

a) Calculate the value of $\angle BAC$? Round your answer to the nearest degree.

Ans: _____

b) BD is 4 m long. Work out the length of AD, giving your answer correct to 2 decimal places.

Ans: _____

(7 marks)

9.

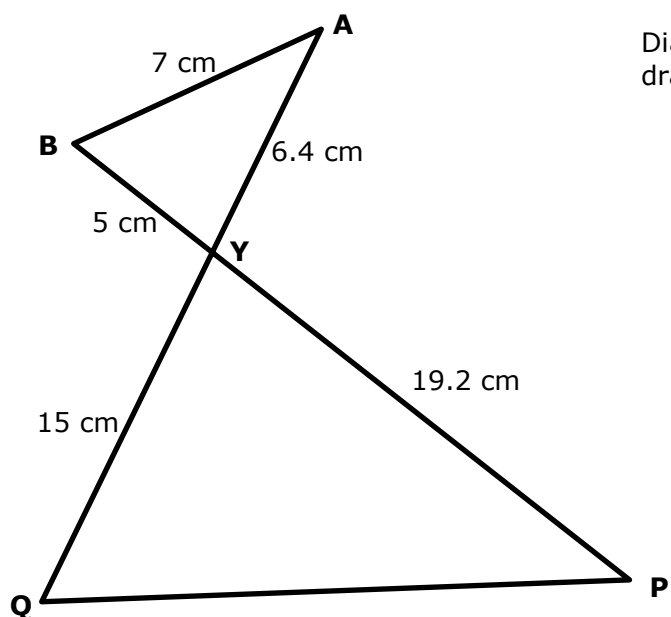


Diagram NOT
drawn to scale

AQ and BP are two straight lines intersecting at Y.

a) Show that triangle ABY is similar to triangle PQY.

b) Calculate the length of PQ.

Ans: _____

c) $\angle ABY = 72^\circ$ and $\angle BYA = 68^\circ$. What is the value of $\angle YPQ$?

Ans: _____

d) Prove that the points A, B, P and Q lie on a circle.

(8 marks)

10.

Recommended daily amount of iron needed		
Age (years)	Males	Females
15-18	11 mg	15 mg
19-50	9 mg	15 mg

Iron content in Food		
Food	Amount (grams)	Iron Content (milligrams)
Chicken Liver	100 g	8.8 mg
Beef	100 g	5.5 mg
Broccoli	100 g	0.75 mg
Spinach	100 g	2.8 mg
Pasta	240 g	2.0 mg
Potatoes	100 g	0.8 mg

a) Thea is 17 years old. Her plate contains 200 g of beef and 300 g of broccoli.

i) How much iron, in mg, does the food in her plate contain?

Ans: _____

ii) Mention **one other** type of vegetable and its least amount that Thea may add to her plate to reach her recommended daily amount of iron. Explain.

Ans: _____ g of _____ (vegetable)

b) Bradley is 22 years old. On Monday he gets 5 mg of iron.

i) What percentage of the daily amount needed, does Bradley get on Monday?

Ans: _____

ii) On Tuesday Bradley gets 8.5 mg of iron.
What is the percentage increase in the amount of iron he got?

Ans: _____

(8 marks)

11. ABCD is a parallelogram. DM and BN are both perpendicular to the diagonal AC.

- a) Show that triangle ADM is congruent to triangle CBN.

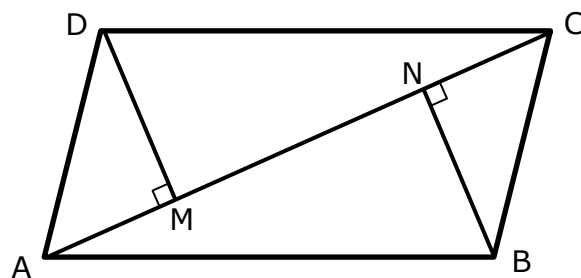
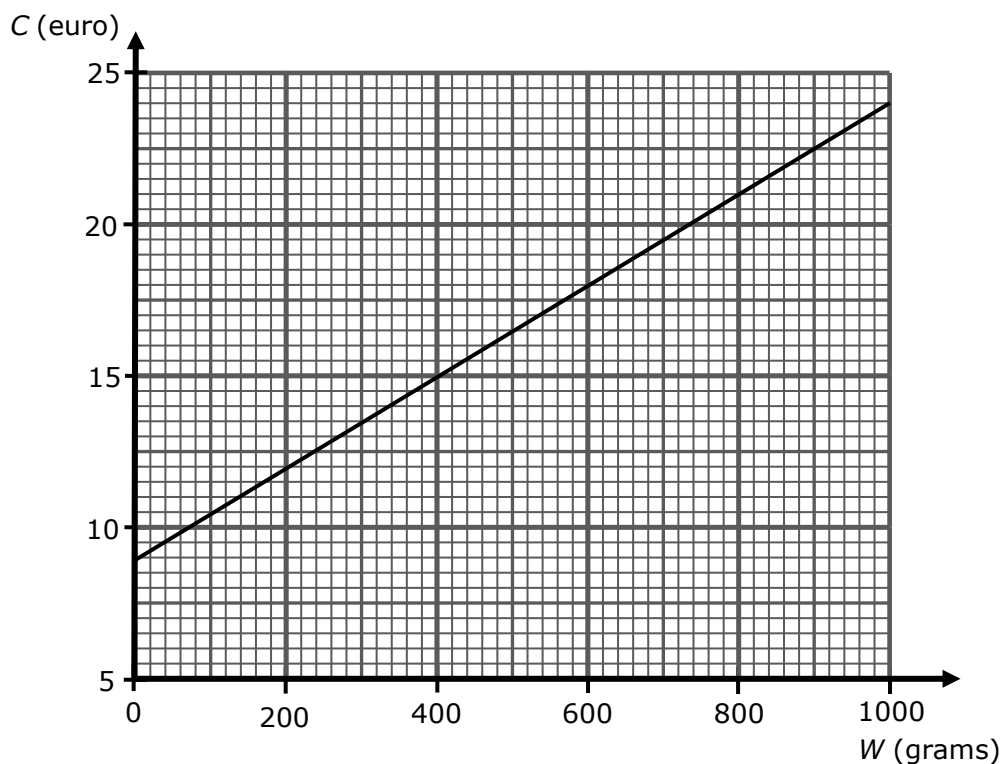


Diagram NOT drawn to scale

- b) $AC = 20$ cm and $AM = x$ cm. Write an expression for the length of MN.

(5 marks)

12. **Express Company** delivers parcels. The delivery cost (C) in euro and the weight (W) in grams of the parcel are connected by the graph below.



- a) Nathan pays €15 for the delivery of a parcel. What is its weight?

Ans: _____

b) How much is charged for a 500 g parcel?

Ans: _____

c) Do you agree with the following statement? "Double the weight of the parcel means double the cost." Explain.

d) **Fast Company** also delivers parcels. Its delivery cost C in euro and the weight W in grams are connected by the formula:

$$C = 15 + 0.005W$$

i) Complete the table below for the above formula.

W	200	400	800
15	15	15	
$+0.005W$	1		
C			

ii) On the grid given at the beginning of the question, plot the straight line of $C = 15 + 0.005W$.

.

iii) What is the weight for which both Express Company and Fast Company charge the **same cost**? How much is this cost?

Ans: Weight is _____ ; Cost is _____

iv) Omar has a parcel of weight **2 kg** to be delivered.
Which company is cheaper? Explain.

(11 marks)

END OF EXAMINATION

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