Grade 10 Mathematics: Question Paper 2

**MARKS: 100**   **TIME: 2 hours**

QUESTION 1

1.1 Give the co-coordinates of A′, the new co-ordinates of the point A(-2; 5) if:
     1.1.1 It is reflected about the x-axis (1)
     1.1.2 It is reflected about the y-axis (1)
     1.1.3 It is reflected about the line y = x (2)

1.2 Given the points A(-3; 2), B(5; -1) and C(2; p), calculate:
     1.2.1 The length of the line segment AB. (2)
     1.2.2 The co-ordinates of M, the midpoint of the line segment AB. (2)
     1.2.3 The value of p if the gradient of BC is 2. (3)

1.3 In ∆ABC below, Ĉ = 53,14° and AC = 20 metres.
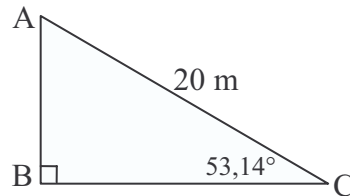
     1.3.1 Calculate the value of AB. (2)
     1.3.2 Hence, express BC in terms of tan53,14°. (2)

1.4 The base of the rectangular prism below has a length 18 cm a breadth x cm. The height of the prism is 5 cm.
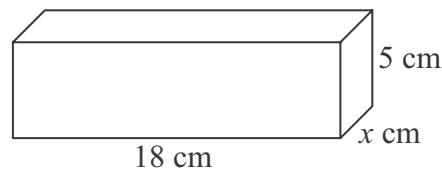
     Calculate the following in terms of x:
     1.4.1 The volume of the prism. (2)
     1.4.2 The new breadth of the prism, if the volume of the prism is doubled, but the length and the height remain the same. (1)

1.5 The ages of the people in the Jackson family are as follows:
     63; 32; 34; 64; 32; 27; 35
     1.5.1 Determine the mean. (2)
     1.5.2 Determine the mode. (1)
     1.5.3 Determine the median. (2)
     1.5.4 Determine the upper quartile. (2)
                                                         [25]

QUESTION 2

ΔABC has co-ordinates A(-4; 2), B(1; 2) and C(-1; 6), and AC = 5 units
2.1   Determine the lengths of AB and BC   (3)
2.2   What kind of triangle is ΔABC. Give a reason for your answer.   (2)
2.3   Explain why ΔABC cannot be right angled.   (5)
2.4
        If D is the point (x; y) such that E($2\frac{1}{4}$; 7) is the midpoint of CD. Determine the

        co-ordinates of D.   (3)
2.5   Show that the quadrilateral ABCD is a trapezium.   (5)

                                                                                             [18]

QUESTION 3

In the diagram below there are 4 triangles (labeled Δ's 1 – 4) that are shaded in grey and 1
triangle (ΔABC) shaded in white.
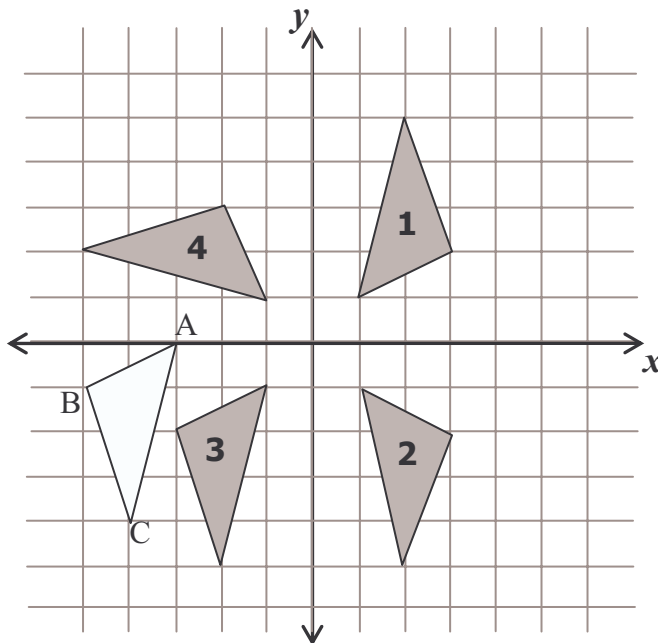


3.1   Copy and complete the following statements by filling in a 1, 2, 3, or a 4:

        3.1.1   Δ __ is the reflection of Δ __ in the y-axis (and vice versa).
                                                                                               (2)
        3.1.2   Δ __ is the reflection of Δ __ in the x-axis (and vice versa).   (2)
        3.1.3   Δ __ is the reflection of Δ __ in the line $y = x$ (and vice versa).   (2)

3.2   The white triangle, ΔABC, has co-ordinates A(-3;0); B(-5;-1) and C(-4; -4).
        3.2.1   Describe the transformation that has occurred from Δ3 to ΔABC.
                                                                                               (2)
        3.2.2   If ΔABC is reflected along the line $y = x$, draw ΔA′B′C′ on the grid
                  provided and write down the co-ordinates of each point.   (6)

                                                                                             [14]

QUESTION 4

A candle maker makes candles with a radius, r and a height, h referred to as Type A.
See the diagram below.
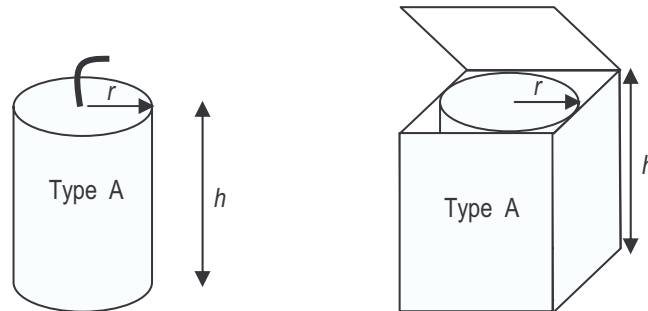
The candle maker also makes two other types of candle: Type B and Type C.

4.1　　Type B candles have the same radius and double the height of the Type A
　　　candle.
　　　Express the volume of wax needed to make Type B candles in terms of the
　　　volume of wax needed to make Type A candles.　　　　　　　　　　　　　(2)

4.2　　Type C candles have the same height and double the radius of the Type A
　　　candle.
　　　Express the volume of wax needed to make Type C candles in terms of the
　　　volume of wax needed to make Type A candles.　　　　　　　　　　　　　(2)

4.3　　What will be the impact on the height if he wants to make a candle with the same
　　　volume of wax as the Type A candle, but wants it to have half the radius.　　　(2)

4.4　　The candles are transported by packing each candle into a rectangular box.
　　　Shown in the diagram above.

　　　If the radius of a Type A candle is $2\frac{1}{2}$ cm and the height is 11cm, calculate the

　　　area of cardboard needed to make up boxes for the Type A candles.　　　　　(3)

[9]

QUESTION 5

The diagram below is a rough, un-scaled plan of the front structure of a house and garage.
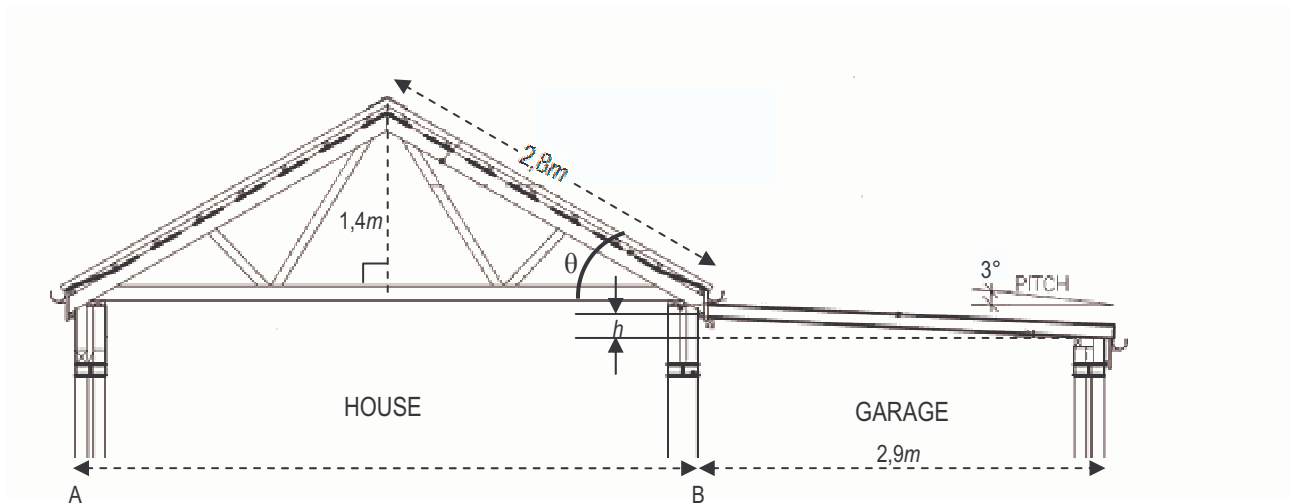
5.1   Calculate the value of h.   (4)
5.2   Calculate the pitch of the house roof (shown as θ on the diagram).   (4)
5.3   Calculate the width of the house (shown as length AB on the diagram).   (3)
5.4   What would be the impact on h if the pitch of the garage roof was changed to be
         15°. Show your working.   (4)

[15]

QUESTION 6

Skype is a free Voip (voice over internet protocol) solution which allows you to instant message or talk to people all over the world. Skype has experienced rapid growth since its launch in August 2003. The table below shows the "Real" Skype Users (approx 10% of those registered on skype) in 9 sub-regions.

Real Users: Sub-Regional			
Europe/Mid East/Africa	W. Europe	E. Europe/Mid East	Africa	Subtotal
	2,054,568	3,467,114	2,311,409	7,833,108
Americas (North/South)	USA	Canada	S. America	Subtotal
	2,801,348	916,817	4,706,325	8,424,525
Asia/ Pacific	Aus/NZ/Jap/Tal/S.Kor	China	India/Other	Subtotal
	1,760,401	2,112,482	1,267,489	5,140,372
Total "real" users				21,398,007

www.homepage.mac.com/hhbv/blog/skypegrowth/skypegrowth.html

6.1   Draw a pie chart to illustrate usage by sub-regions in the "Asia/Pacific" region.   (5)

6.2   Calculate the number of degrees required to draw the "Africa" section of a pie chart showing all of the "Total real users".   (2)

6.3   Which sub-region makes up approximately $\frac{2}{9}$ of the "Total real users"?   (2)

6.4   How much do people talk on skype for in a day? Below is a histogram showing results in a sample group of 150 university students and the number of words spoken by each on skype on one particular day.
(Please note that the information shown here is not official skype statistics and does not claim to be a true representation of the actual skype usage trends).

Skype usage in a sample of 150 university students
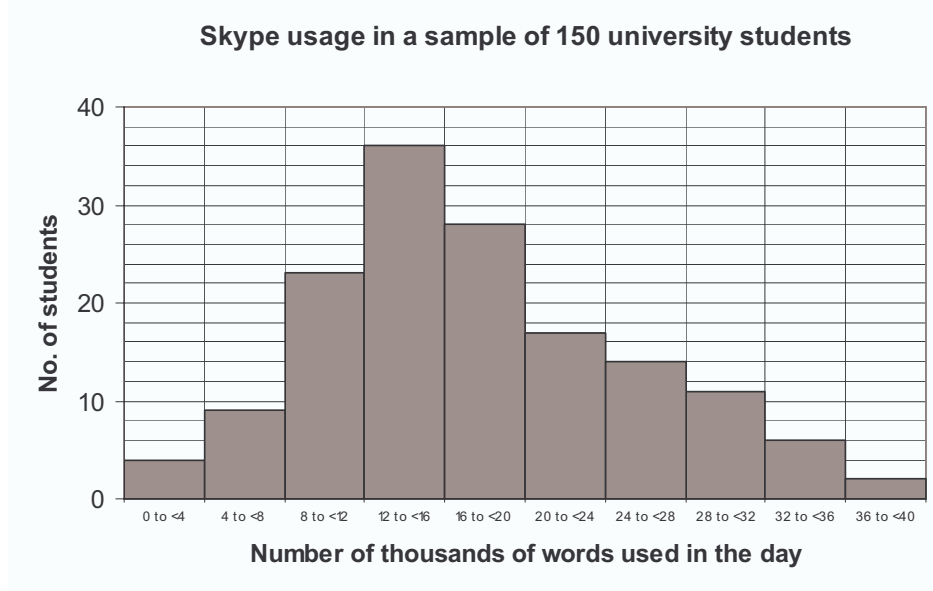
6.4.1   What is the range?   (1)
6.4.2   What is the modal group?   (1)
6.4.3   Which group contains the median value?   (2)
6.4.4   Calculate the estimated mean? (Show all your calculations and give your answer to the nearest word).   (5)

[19]

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