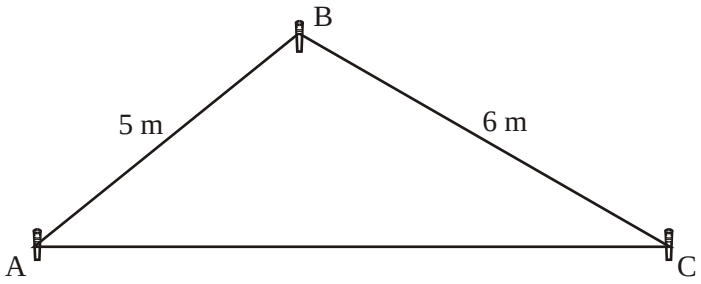
1. A gardener pegs out a rope, 19 metres long, to form a triangular flower bed as shown in this diagram.

Diagram not to scale



Calculate

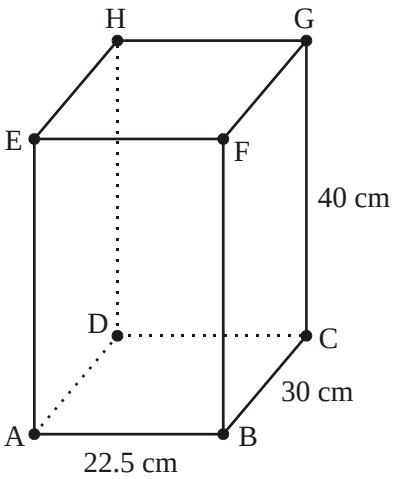
(a) the size of the angle BAC;

(3)

(b) the area of the flower bed.

(2)
(Total 5 marks)

2. The diagram shows a cuboid 22.5 cm by 40 cm by 30 cm.

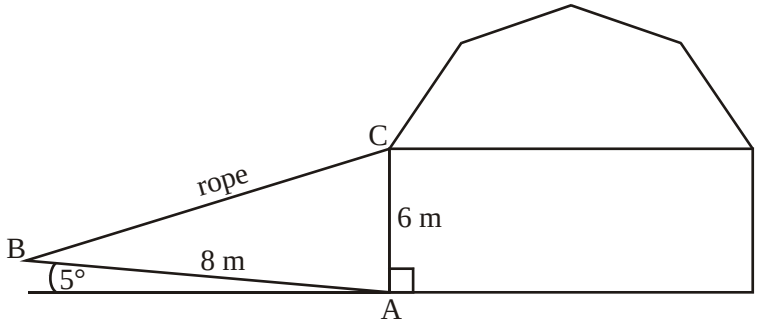


(a) Calculate the length of [AC].

(b) Calculate the size of $G\hat{A}C$.

(Total 4 marks)

3. The following diagram shows the side view of a tent. The side of the tent AC is 6 m high. The ground AB slopes upwards from the bottom of the tent at point A, at an angle of 5° from the horizontal. The tent is attached to the ground by a rope at point B, a distance of 8 m from its base.



(a) Calculate the angle BAC.

(b) Calculate the length of the rope, BC.

(c) Calculate the angle CBA that the rope makes with the sloping ground.

(Total 8 marks)

4. (a) A girl's height is 1.623 m. Write her height **to the nearest cm**.

(b) The time taken to fill a tank was 2 hours 43 minutes. Write this time **to the nearest 5 minutes**.

(c) The attendance at a show was 2591 people. How many people, **to the nearest 100**, were at the show?

(d) The mean distance of the Moon from the Earth is approximately 384 403 km. Write this distance in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 4 marks)

5. A woman deposits \$100 into her son's savings account on his first birthday. On his second birthday she deposits \$125, \$150 on his third birthday, and so on.

(a) How much money would she deposit into her son's account on his 17th birthday?

(b) How much in total would she have deposited after her son's 17th birthday?

(Total 4 marks)

6. Mr Jones decides to increase the amount of money he spends on food by *d* GBP every year. In the first year he spends *a* GBP. In the 8th year he spends twice as much as in the 4th year. In the 20th year he spends 4000 GBP.

Find the value of *d*.

(Total 4 marks)

7. The population of Bangor is growing each year. At the end of 1996, the population was 40 000. At the end of 1998, the population was 44 100. Assuming that these annual figures follow a geometric progression, calculate

(a) the population of Bangor at the end of 1997;

(b) the population of Bangor at the end of 1992.

(Total 4 marks)

8. On Vera's 18^{th} birthday she was given an allowance from her parents. She was given the following choices.

Choice A	\$100 every month of the year.
Choice B	A fixed amount of \$1100 at the beginning of the year, to be invested at an interest rate of 12% per annum, compounded monthly.
Choice C	\$75 the first month and an increase of \$5 every month thereafter.
Choice D	\$80 the first month and an increase of 5% every month.

(a) Assuming that Vera does not spend any of her allowance during the year, calculate, for each of the choices, how much money she would have at the end of the year.

(8)

(b) Which of the choices do you think that Vera should choose? Give a reason for your answer.

(2)

(c) On her 19^{th} birthday Vera invests \$1200 in a bank that pays interest at *r*% per annum compounded annually. Vera would like to buy a scooter costing \$1452 on her 21^{st} birthday. What rate will the bank have to offer her to enable her to buy the scooter?

(4)

(Total 14 marks)

9. A National Lottery is offering prizes in a new competition. The winner may choose one of the following.

Option one: \$1000 each week for 10 weeks.

Option two: \$250 in the first week, \$450 in the second week, \$650 in the third week, increasing by \$200 each week for a total of 10 weeks.

Option three: \$10 in the first week, \$20 in the second week, \$40 in the third week continuing to double for a total of 10 weeks.

(a) Calculate the amount you receive in the tenth week, if you select

(i) **option two**;

(ii) **option three**.

(6)

(b) What is the total amount you receive if you select **option two**?

(2)

(c) Which option has the greatest total value? Justify your answer by showing all appropriate calculations.

(4)

(Total 12 marks)

10. Mr Tan invested 5000 Swiss Francs (CHF) in Bank A at an annual simple interest rate of r %, for four years. The total interest he received was 568 CHF.

(a) Calculate the value of r.

(3)

Mr Black invested 5000 CHF in Bank B at a nominal annual interest rate of 3.6 %, **compounded quarterly** for four years.

(b) Calculate the total interest he received at the end of the four years. Give your answer correct to **two decimal places**.

(3)

(Total 6 marks)

11. The diagram shows triangle ABC in which angle $B\hat{A}C = 30°$, BC = 6.7 cm and AC = 13.4 cm.

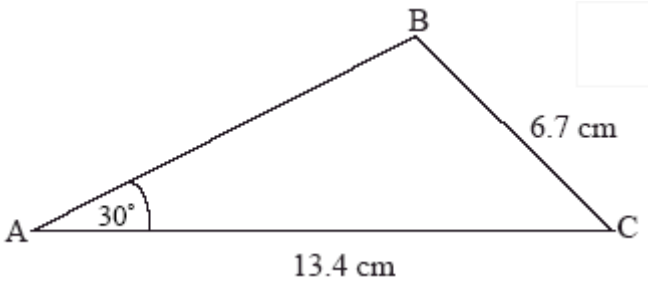


diagram not to scale

(a) Calculate the size of angle $A\hat{C}B$.

(4)

Nadia makes an accurate drawing of triangle ABC. She measures angle $B\hat{A}C$ and finds it to be 29°.

(b) Calculate the percentage error in Nadia's measurement of angle $B\hat{A}C$.

(2)
(Total 6 marks)

12. Daniel wants to invest $25 000 for a total of three years. There are three investment options.

Option One pays simple interest at an annual rate of interest of 6 %.

Option Two pays compound interest at a nominal annual rate of interest of 5 %, compounded **annually**.

Option Three pays compound interest at a nominal annual rate of interest of 4.8 %, compounded **monthly**.

(a) Calculate the value of his investment at the end of the third year for each investment option, **correct to two decimal places**.

(8)

(b) Determine Daniel's best investment option.

(1)
(Total 9 marks)