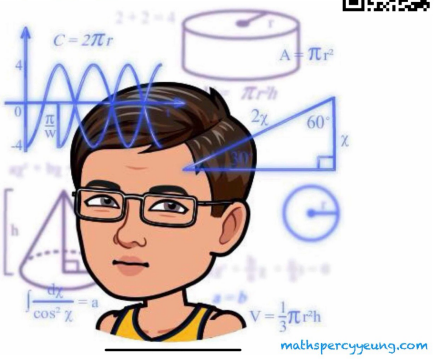
2023-2024 S2
1st TERM EXAM
MATH



2023 – 2024
S2 First Term Examination

MATHEMATICS

Question–Answer Book

4th January, 2024
8:15 am – 9:45 am (1 hour 30 minutes)
This paper must be answered in English

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. Answer ALL questions in Section A. You should use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured. You should mark only ONE answer for each question. If you mark more than one answer, you will receive NO MARKS for that question.

3. Attempt ALL questions in Sections B and C. Write your answers in the spaces provided in this Question – Answer Book.

4. Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.

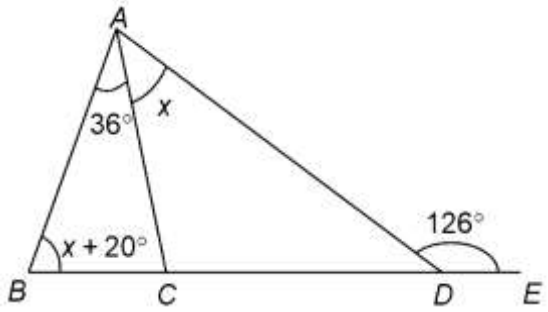
5. The diagrams in this paper are not necessarily drawn to scale.

Sections	Marks
A Total	**/30**
B (31 – 33)	
B (34 – 39)	
B Total	**/40**
C Total	**/30**
TOTAL	**/100**

Section A (30 marks)

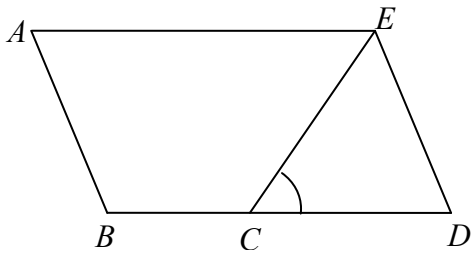
Choose the best answer for each question.

1. In the figure, $BCDE$ is a straight line. Find x.



A. 35°
B. 40°
C. 45°
D. 50°

2. In the figure, $ABDE$ is a parallelogram. C is a point on BD such that $CD = DE$.

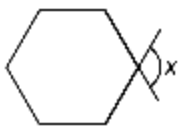


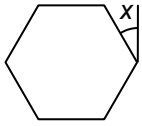
If $\angle BAE = 68°$, then $\angle DCE =$

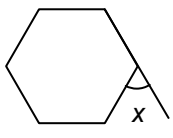
A. 50°.
B. 56°.
C. 62°.
D. 68°.

3. In which of the following figures, x is an exterior angle of the hexagon?

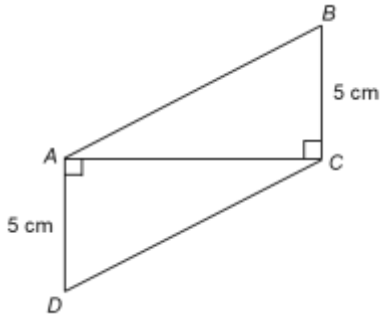
A. 

B. 

C. 

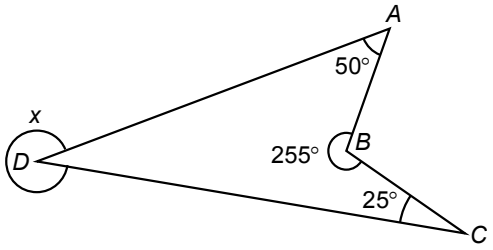
D. 

4. Refer to the figure. The reason for $\triangle ABC \cong \triangle CDA$ is



A. SAS.
B. SSS.
C. AAS.
D. RHS.

5. In the figure, $x =$

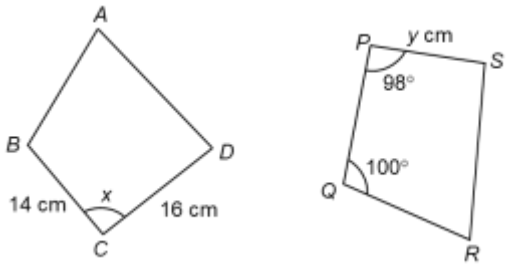


A. 250°.
B. 280°.
C. 300°.
D. 330°.

6. Find the size of each exterior angle of a regular 45-sided polygon.
   A. 4°
   B. 6°
   C. 8°
   D. 10°

7. Which of the following cannot tessellate?
   A. Equilateral triangles
   B. Squares
   C. Regular hexagons
   D. Regular 12-sided polygons

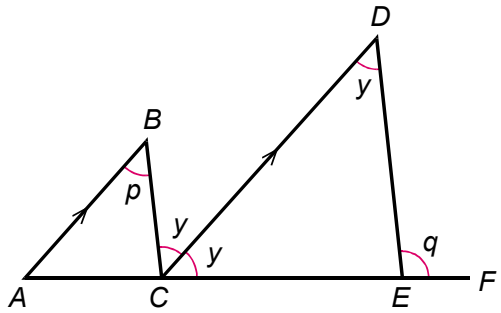
8. In the figure, $ABCD \cong RQPS$.



Find x and y.

A. $x = 98°, y = 16$
B. $x = 98°, y = 14$
C. $x = 100°, y = 14$
D. $x = 100°, y = 16$

9. In the figure, $ACEF$ is a straight line, $AB // CD$. Which of the following must be correct?

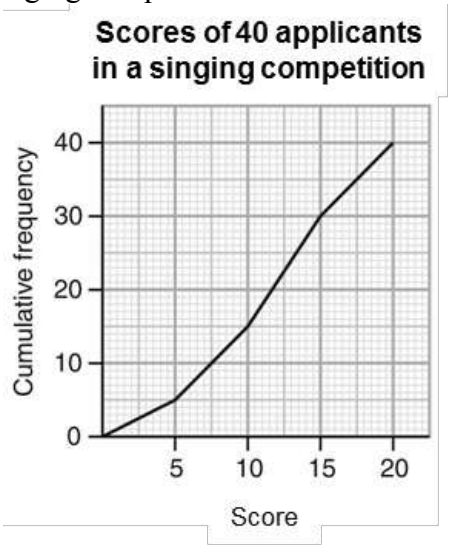


A. $p + q = 180°$
B. $q - p = 90°$
C. $3p = q$
D. $2p = q$

10. Air is a composition of different types of gases. If we want to show the percentage of each type of gas in air, which statistical chart should be used?

A. Bar chart
B. Histogram
C. Frequency polygon
D. Pie chart

11. The cumulative frequency polygon below shows the scores of 40 applicants in a singing competition.



How many applicants scored 10 marks or above?

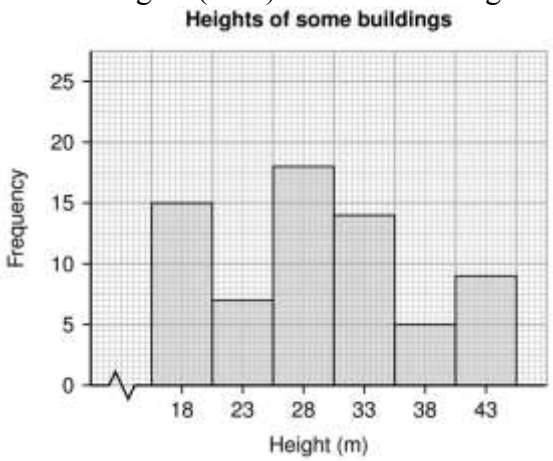
A. 10
B. 15
C. 20
D. 25

12. Which of the following data can be presented using a histogram?

I. The weights of ducks in a farm
II. Favourite flavours of cookies sold in a bakery
III. The time taken for swimming 100 m freestyle by the school swimming team members

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

13. The histogram below shows the distribution of the heights (in m) of some buildings.



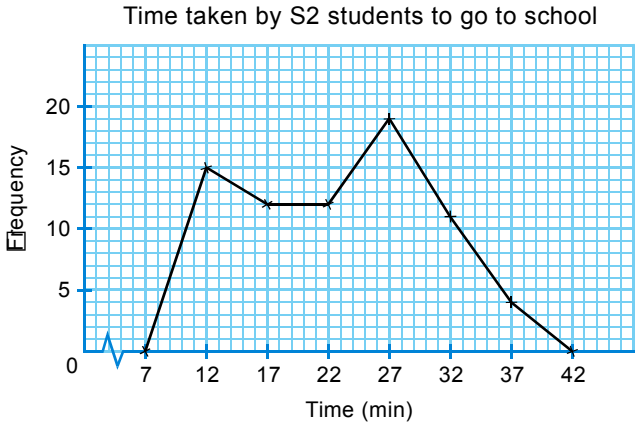
The lower class boundary of the class interval with the lowest frequency is

A. 35 m.
B. 35.5 m.
C. 38 m.
D. 40.5 m.

14. Which of the following is NOT a rate?

A. 30 km/h
B. 3/4
C. \$20/kg
D. 400 Cal/kg

15. The following frequency polygon shows the time taken by S2 students to go to school.



Which class interval do most students belong to?

A. 10 min - 14 min
B. 9.5 min - 14.5 min
C. 25 min - 29 min
D. 24.5 min - 29.5 min

16. Ken paints a wall at a rate of 0.5 m^2/s. Find the time taken for Ken to paint a rectangular wall of dimensions 20m × 18m.

A. 0.2 min
B. 3 min
C. 6 min
D. 12 min

17. If $9:1=(8x+8):10$, find the value of x.

A. 9
B. 10
C. $\frac{39}{4}$
D. $\frac{41}{4}$

18. The costs of coffee beans of brand A and brand B are \$0.63/g and \$0.28/g respectively. If x g of coffee beans of brand A and y g of coffee beans of brand B are mixed so that the cost of the mixture is \$0.42/g, then $x : y =$

A. 2 : 3.
B. 3 : 2.
C. 4 : 9.
D. 9 : 4.

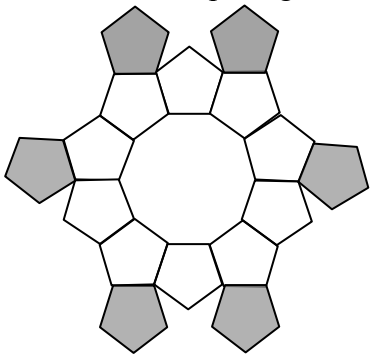
19. Let a, b and c be non-zero numbers. If $4a = 7b$ and $2b = 3c$, then $a : b : c =$

A. 21 : 12 : 8.
B. 21 : 14 : 8.
C. 8 : 12 : 21.
D. 8 : 14 : 21.

20. The weights of Ann, Betty and Candy are 45 kg, 60 kg and 50 kg respectively. Find Ann's weight : Betty's weight : Candy's weight.

A. 4 : 6 : 5
B. 5 : 6 : 4
C. 9 : 12 : 10
D. 10 : 12 : 9

21. The figure is formed by 16 identical regular pentagons and some of them are shaded. Find the ratio of the number of white pentagons to the number of shaded pentagons.



A. 3 : 5
B. 3 : 8
C. 5 : 3
D. 5 : 8

22. Amy reads 10 pages of a novel in 15 minutes. Suppose the novel has n pages. If she reads at the same rate, the time taken by Amy to finish reading the whole novel is

A. $\frac{n}{15}$ min.
B. $\frac{3n}{2}$ min.
C. $\frac{2n}{3}$ min.
D. $\frac{n}{150}$ min.

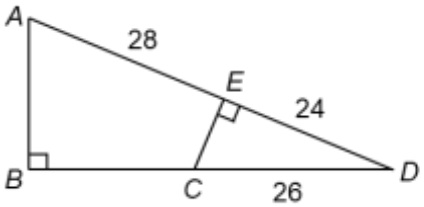
23. It is given that $\triangle FGH \sim \triangle PQR$. If $\angle F = 62°$ and $\angle Q = 40°$, find $\angle R$.

A. 40°
B. 62°
C. 78°
D. 102°

24. It is given that $\triangle PQR \sim \triangle XYZ$. If PQ = 4 cm, XY = 5 cm and PR = 6 cm, find XZ.

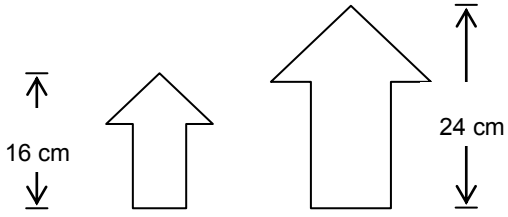
A. 4.8 cm
B. 7 cm
C. 7.5 cm
D. 9.5 cm

25. In the figure, AED and BCD are straight lines. $AB \perp BD$ and $CE \perp AD$. Find BC.



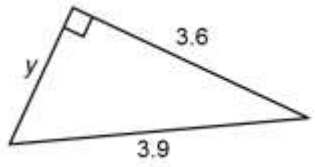
A. 22
B. 24
C. 26
D. 28

26. The figure shows two similar figures. What is the ratio of the corresponding heights of Figure B to Figure A?



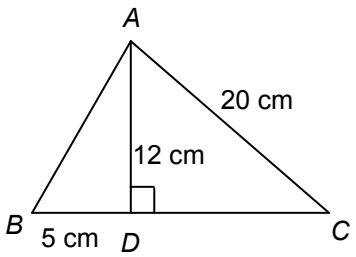
A. 2 : 3
B. 3 : 2
C. 1 : 2
D. 2 : 1

27. Find the value of y in the figure.



A. 1.5
B. 1.8
C. 2.1
D. 2.4

28. In $\triangle ABC$, D is a point on BC such that $AD \perp BC$. AD = 12 cm, AC = 20 cm and BD = 5 cm. Find the perimeter of $\triangle ABC$.

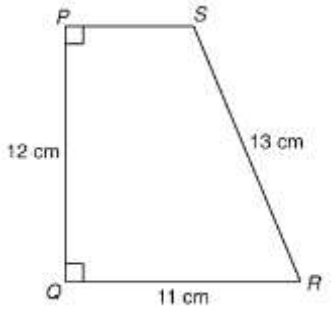


A. 36 cm
B. 45 cm
C. 54 cm
D. 63 cm

29. A job can be completed by N workers in T days. If the number of workers is decreased by 20%, find the percentage increase in time to complete the job. (Assume all workers work at the same rate.)

A. 20%
B. 25%
C. 30%
D. 35%

30. Find the area of trapezium $PQRS$ shown in the figure.



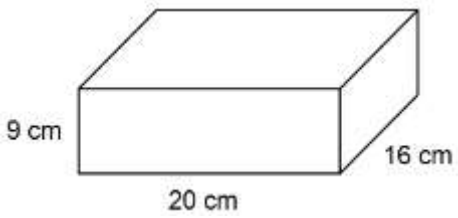
A. 96 cm^2
B. 102 cm^2
C. 192 cm^2
D. 204 cm^2

Section B (40 marks)

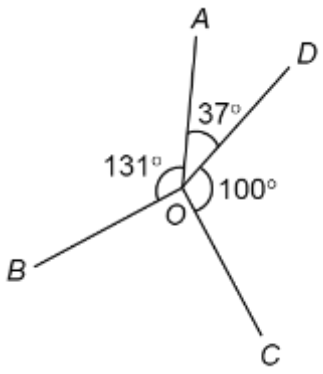
1. Solve the equation $3(a+5) = -(5-2a)$. (2 marks)

2. Determine whether the following are discrete data or continuous data. (2 marks)
   (a) The blood pressures of some patients suffering from heart disease
   (b) The numbers of words in some articles in a newspaper

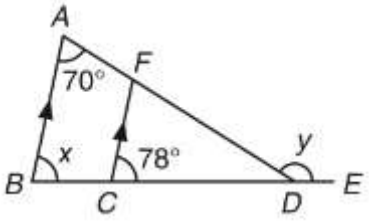
3. Find the total surface area of the cuboid in the figure. (2 marks)



4. Refer to the figure. Is *BO* perpendicular to *OC*? Explain your answer. (2 marks)



5. In the figure, *BCDE* and *AFD* are straight lines, and *BA* // *CF*. Find *x* and *y*. (3 marks)



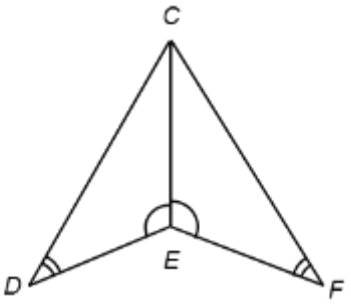
6. If an interior angle of a regular polygon is three times its exterior angle, find the number of sides of the regular polygon. (4 marks)

7. Simplify 2 km : 6000 cm : 800 m. (2 marks)

8. In the figure, $\angle CDE = \angle CFE$ and $\angle CED = \angle CEF$. (6 marks)

(a) Prove that $\triangle CDE \cong \triangle CFE$.

(b) If the perimeters of $\triangle CDE$ and quadrilateral $CDEF$ are 17 cm and 24 cm respectively, find the length of CE.



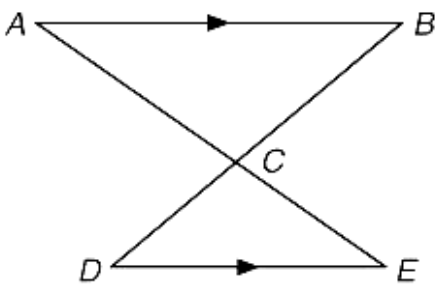
9. If a and b are non-zero numbers such that $(2a-b):(3a+b)=4:11$, find a : b. (4 marks)

10. On a floor plan with a scale 1 : 150, the length and width of a rectangular meeting room are 4 cm and 3 cm respectively. Find the actual area of the meeting room in m^2. (3 marks)

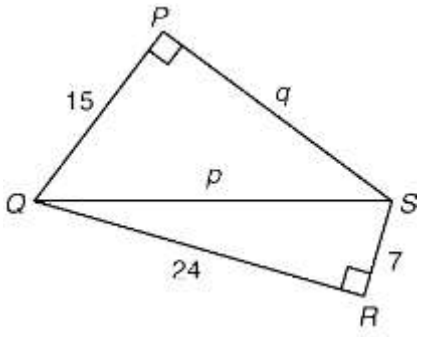
11. In the figure, AE and BD intersect at C and AB // DE. (6 marks)

(a) Prove that $\triangle ABC \sim \triangle EDC$.

(b) If $AB = 12$ cm, $AC = 8$ cm and $CE = 6$ cm, find DE.



12. Find the values of p and q in the figure. (4 marks)



Section C (30 marks)

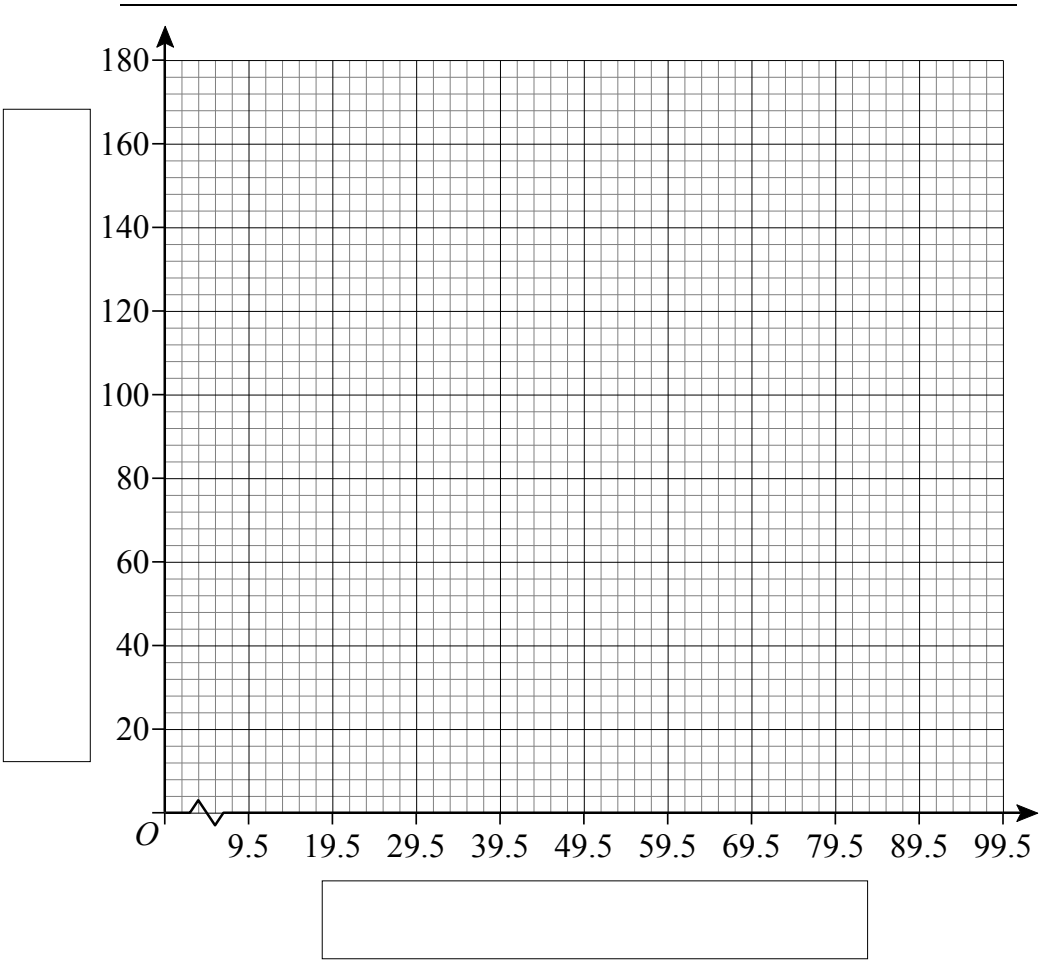
13. The following table shows the average daily time spent by 160 students on physical exercise.

Time (min)	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89
Frequency	40	8	16	20	36	16	0	24

(a) Construct a cumulative frequency table. (2 marks)

Time less than (min)	Cumulative frequency
9.5	

(b) Draw a cumulative frequency polygon. (3 marks)

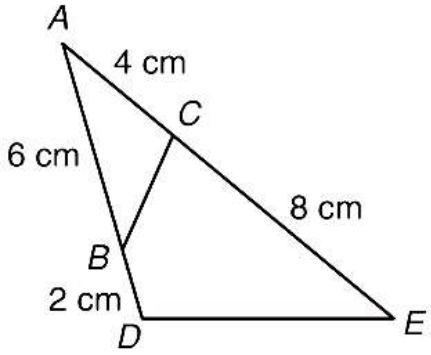


(c) From the graph in (b), find the lower quartile, median and upper quartile. (4 marks)

(d) A school is promoting the healthy lifestyle scheme and requests students to exercise 30 min or above on average every day. The average daily time spent by Rainie on physical exercise is P_{40}, does she meet the requirement of the school? (2 marks)

14. Given that the lengths of the two shorter sides of a right-angled triangle are in the ratio 12 : 35 and the length of the longest side is 74 cm, find the lengths of the two shorter sides. (4 marks)

15. In the figure, ABD and ACE are straight lines.



(a) Prove that $\triangle ABC \sim \triangle AED$. (3 marks)

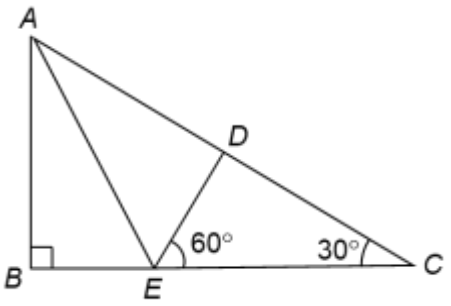
(b) If $BC = \left(2x - \frac{1}{2}\right)$ cm and $DE = (3x + 1)$ cm, find x. (3 marks)

(c) Hence, find the perimeter of $\triangle ADE$. (2 marks)

16. In the figure, D is a point on AC such that $AB = AD$. E is a point on BC.

(a) Prove that $\triangle ABE \cong \triangle ADE$. (3 marks)

(b) Are the lengths of AE and CE equal? Explain your answer. (4 marks)



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