KD EDUCATION ACADEMY [9582701166]

STD 9 Maths

Time : 6 hour

Total Marks : 150

kd 90+ questions ch- 10 Heron's formula

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* **Choose the right answer from the given options. [1 Marks Each]** **[48]**

1. The lengths of three sides of a triangle are 20cm, 16cm and 12cm. The area of the triangle is:

   (A) 96cm^2　　(B) 120cm^2　　(C) 144cm^2　　(D) 160cm^2

2. The base of a right triangle is 8cm and the hypotenuse is 10cm. Its area will be:

   (A) 24cm^2　　(B) 40cm^2　　(C) 48cm^2　　(D) 80cm^2

3. The adjacent sides of a parallelogram are 20cm and 15cm in length. Then the ratio between the corresponding altitudes is:

   (A) 2 : 3　　(B) 3 : 4　　(C) 4 : 3　　(D) 1 : 2

4. If side of a scalene $\triangle$ is doubled then area would be increased by:

   (A) 200%　　(B) 25%　　(C) 50%　　(D) 300%

5. The lengths of the three sides of a triangle are 30cm, 24cm and 18cm respectively. The length of the altitude of the triangle corresponding to the smallest side is:

   (A) 18cm　　(B) 30cm　　(C) 12cm　　(D) 24cm

6. The area of a triangle with base 8cm and height 10cm is:

   (A) 20cm^2　　(B) 40cm^2　　(C) 18cm^2　　(D) 80cm^2

7. If every side of a triangle is doubled, then increase in the area of the triangle is:

   (A) $100\sqrt{2}\%$　　(B) 200%　　(C) 300%　　(D) 400%

8. The sides of a triangle are x, y and z. If x + y = 7m, y + z = 9m, and z + x = 8m, then area of the triangle is:

   (A) 7m^2　　(B) 4m^2　　(C) 5m^2　　(D) 6m^2

9. The sides of a triangle are in the ratio of 3: 5: 7 and its perimeter is 300cm. Its area will be:

   (A) $1000\sqrt{3}$sq. cm　　(B) $1500\sqrt{3}$sq. cm　　(C) $1700\sqrt{3}$sq. cm　　(D) $1900\sqrt{3}$sq. cm

10. One of the diagonals of a rhombus is 12cm and area is 96 sq cm. the perimeter of the rhombus is:

    (A) 72cm　　(B) $\sqrt[6]{10}$cm　　(C) 40cm　　(D) $\sqrt[3]{10}$cm

11. If side of equilateral triangle is 25m. Its area is:

    (A) $5\sqrt{3}$ sq.cm　　(B) $\frac{625}{4}\sqrt{3}$ sq.cm　　(C) $54\sqrt{3}$ sq.cm　　(D) $\sqrt{3}$ sq.cm

12. The sides of a triangle are in ratio 3 : 4 : 5. If the perimeter of the triangle is 84cm, then area of the triangle is:

    (A) 290cm^2　　(B) 252cm^2　　(C) 274cm^2　　(D) 294cm^2

13. The area of a right-angled triangle is 20m^2 and one of the sides containing the right triangle is 4cm. Then the altitude on the hypotenuse is:

    (A) 10cm　　(B) $\frac{10}{\sqrt{41}}$cm　　(C) $\frac{20}{\sqrt{29}}$cm　　(D) 8cm

14. The area of equilateral triangle of side 'a' is $4\sqrt{3}$cm^2. Its height is given by:

(A) $\frac{2}{\sqrt{3}}$ cm   (B) $2\sqrt{3}$ cm   (C) $\frac{1}{3}$ cm   (D) $\sqrt{3}$ cm

15. The sides of a triangle are 325m, 300m and 125m. Its area is:

(A) 37500m^2 (B) 48750m^2 (C) 18750m^2 (D) 97500m^2

16. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2}$ cm, then area of the triangle is:

(A) $24\sqrt{2}$ cm^2 (B) $24\sqrt{3}$ cm^2 (C) $48\sqrt{3}$ cm^2 (D) $64\sqrt{3}$ cm^2

17. If the area of an equilateral triangle is $\sqrt{163}$ cm^2 then the perimeter of the triangle is:

(A) 12cm   (B) 24cm   (C) 48cm   (D) 306cm

18. The sides of a triangle are in the ratio 12 : 17 : 25 and its perimeter is 540cm. The area is:

(A) 1000 sq.cm   (B) 5000 sq.cm   (C) 9000 sq.cm   (D) 8000 sq.cm

19. The lengths of a triangle are 6cm, 8cm and 10cm. Then the length of perpendicular from the opposite vertex to the side whose length is 8cm is:

(A) 4cm   (B) 6cm   (C) 5cm   (D) 2cm

20. The base of an isosceles right triangle is 30cm. Its area is:

(A) 225 cm^2 (B) $225\sqrt{3}$ cm^2 (C) $225\sqrt{2}$ cm^2 (D) 450 cm^2

21. If side of a scalene $\triangle$ is doubled then area would be increased by:

(A) 200%   (B) 300%   (C) 25%   (D) 50%

22. The area of an equilateral triangle having side length equal to $\sqrt{\frac{3}{4}}$ cm (using Heron's formula) is:

(A) a. $\frac{2}{27}$ sq.cm   (B) b. $\frac{2}{15}$ sq.cm   (C) c. $3\sqrt{\frac{3}{64}}$ sq.cm   (D) d. $\frac{3}{14}$ sq.cm

23. Area of an isosceles triangle ABC with AB = a = AC and BC = b is:

(A) $\frac{1}{2} b\sqrt{a^2 - b^2}$ (B) $\frac{1}{4} b\sqrt{a^2 - b^2}$ (C) $\frac{1}{2} b\sqrt{4a^2 - b^2}$ (D) $\frac{1}{4} b\sqrt{4a^2 - b^2}$

24. The area of a right angled triangle is 20m^2 and one of the sides containing the right triangle is 4cm. Then the altitude on the hypotenuse is:

(A) $\frac{20}{\sqrt{29}}$ cm   (B) 10 cm   (C) $\frac{10}{\sqrt{41}}$ cm   (D) 8 cm

25. The area of a regular hexagon of side 4cm is:

(A) $4\sqrt{3}$ cm^2 (B) $10\sqrt{3}$ cm^2 (C) $6\sqrt{3}$ cm^2 (D) $24\sqrt{3}$ cm^2

26. The diagonal of a rhombus are 24cm and 10cm. Then its perimeter is:

(A) 52cm   (B) 68cm   (C) 40cm   (D) 26cm

27. The sides of a triangle are 35cm, 54cm and 61cm respectively, and its area is $420\sqrt{5}$ cm^2. The length of its longest altitude is:

(A) 28 cm   (B) $10\sqrt{5}$ cm   (C) $21\sqrt{5}$ cm   (D) $24\sqrt{5}$ cm

28. Each side of an equilateral triangle is 2x cm. If $x\sqrt{3} = \sqrt{48}$, then area of the triangle is:

(A) $\sqrt{48}$ cm^2 (B) $48\sqrt{3}$ cm^2 (C) $16\sqrt{3}$ cm^2 (D) 16 cm^2

29. The cost of turfing a triangular field at the rate of Rs. 45 per 100m^2 is Rs. 900. If the double the base of the triangle is 5 times its height, then its height is:

| (A) 42cm | (B) 40cm | (C) 44cm | (D) 32cm |

30. The area of an equilateral triangle having side length equal to $\frac{3}{\sqrt{4}}$ cm is:

(A) $\frac{2}{27}$ sq.cm   (B) $\frac{2}{15}$ sq.cm   (C) $\frac{3}{16}$ sq.cm   (D) $\frac{3}{14}$ sq.cm

31. The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150cm. The area of the triangle is:

(A) 375cm^2 (B) 750cm^2 (C) 250cm^2 (D) 500cm^2

32. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The perimeter of a right angled triangle is 60cm and its hypotenuse is 26cm. The other sides of the triangle are 10cm and 24cm. Also, area of the triangle is 120cm^2.

Reason: (Base)^2 + (Perpendicular)^2 = (Hypotenuse)^2 .

(A) A is true, R is true; R is a correct explanation for A.   (B) A is true, R is true; R is nol a correct explanation for A.   (C) A is true; R is false.   (D) A is false; R is true.

33. The diagonal of a rhombus are 24cm and 10cm. Then its perimeter is:

(A) 40cm   (B) 52cm   (C) 26cm   (D) 68cm

34. If each side of a $\triangle$ is halved then its perimeter will be decreased by:

(A) 70%   (B) 200%   (C) 50%   (D) 25%

35. If the length of a median of an equilateral triangle is x cm, then its area is:

(A) x^2 (B) $\frac{\sqrt{3}}{2}x^2$ (C) $\frac{x^2}{\sqrt{3}}$ (D) $\frac{x^2}{2}$

36. If the perimeter of an equilateral triangle is 180cm. Then its area will be:

(A) 900cm^2 (B) $900\sqrt{3}\text{cm}^2$ (C) $300\sqrt{3}\text{cm}^2$ (D) $600\sqrt{3}\text{cm}^2$

37. The sides of a triangle are 35cm, 54cm and 61cm, respectively. The length of its longest altitude.

(A) $24\sqrt{5}\text{cm}$ (B) 28cm (C) $10\sqrt{5}\text{cm}$ (D) $16\sqrt{5}\text{cm}$

38. The area and length of one diagonal of a rhombus are given as 200cm^2 and 10cm respectively. The length of other diagonal is:

(A) 20cm   (B) 40cm   (C) 25cm   (D) 10cm

39. The edges of a triangular board are 6cm, 8cm and 10cm. The cost of painting it at the rate of 70 paise per cm^2 is:

(A) ₹17   (B) ₹16.80   (C) ₹7   (D) ₹16

40. The perimeter of a triangle is 60cm. If its sides are in the ratio 1 : 3 : 2, then its smallest side is:

(A) 5cm   (B) 10cm   (C) 15cm   (D) 30cm

41. The area of a triangle is 150cm^2 and its sides are in the ratio 3 : 4 : 5. What is its perimeter?

(A) 40cm   (B) 60cm   (C) 50cm   (D) 70cm

42. The area of a rightangled triangle if the radius of its circumcircle is 3cm and altitude drawn to the hypotenuse is 2cm.

(A) 6cm^2 (B) 3cm^2 (C) 4cm^2 (D) 8cm^2

43. The perimeter of a rhombus is 20cm. One of its diagonals is 8cm. Then area of the rhombus is:

    (A) 24cm^2 (B) 42cm^2 (C) 18cm^2 (D) 36cm^2

44. Two adjacent sides of a parallelogram are 74cm and 40cm and one of its diagonals is 102cm. Area of the parallelogram is:

    (A) 2448 sq.cm   (B) 4896 sq.cm   (C) 612 sq.cm   (D) 1224 sq.cm

45. Area of an equilateral triangle of side 10cm is:

    (A) $50\sqrt{3}$cm^2 (B) $100\sqrt{3}$cm^2 (C) $10\sqrt{3}$cm^2 (D) $25\sqrt{3}$cm^2

46. The area of an isosceles triangle having base 24cm and length of one of the equal sides 20cm is:

    (A) 480cm^2 (B) 240cm^2 (C) 196cm^2 (D) 192cm^2

47. The sides of a triangular field are 325m, 300m and 125m. Its area is:
    a.   18750m^2
    b.   37500m^2
    c.   97500m^2
    d.   48750m^2

48. If every side of a triangle is doubled, then increase in the area of the triangle is:
    a. $100\sqrt{2}\%$
    b. 200%
    c. 300%
    d. 400%

*   **A statement of Assertion (A) is followed by a statement of Reason (R).**   **[5]** **Choose the correct option.**

49. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

    Assertion: The sides of a triangle are in the atio of 25 : 14 : 12 and its perimeter is 510cm. Then the area of the triangle is 4449.08cm2.

    Reason: Perimeter of a triangle = a + b + c, where a, b, c are sides of a triangle.
    a.   Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
    b.   Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
    c.   Assertion is true but the reason is false.
    d.   Both assertion and reason are false.

50. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

    Assertion: The sides of a triangle are in the ratio of 25 : 14 : 12 and its perimeter is 510m. Then the greatest side is 250cm.

    Reason: Perimeter of a triangle = a + b + c, where a, b, c are sides of a triangle.
    a.   Both assertion and reason are true and reason is the correct enatixplaon of assertion.

b. Both assertion and reason are true but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Assertion is false but reason is true.

51. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The side of an equilateral triangle is 6cm then the height of the triangle is 9cm.

Reason: The height of an equilateral triangle is $\frac{\sqrt{3}}{2}a$.

a. Both assertion and reason are true and reason is the correct enatixplaon of assertion.

b. Both assertion and reason are true but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Assertion is false but reason is true.

52. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: The height the triangle is 18cm and its area is 72cm^2 and it's base is 8cm.

Reason: $\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$.

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.

b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c. Assertion is true but the reason is false.

d. Both assertion and reason are false.

53. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: If $2S = \frac{(a+b+c)}{2}$ where a,b,c are the sides of triangle then area $= \sqrt{s(s-a)(s-b)(s-c)}$.

Reason: The sides of triangle are 3cm, 4cm, 5cm it's area is 6cm^2

a. Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.

b. Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.

c. Assertion is true but the reason is false.

d. Both assertion and reason are false.

* Answer the following short questions. [2 Marks Each]   [2]

54. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

* Answer the following questions. [3 Marks Each]   [15]

55.

Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm.

56. A triangular park ABC has sides 120 m, 80 m and 50 m. (in a given figure). A gardener Dhania has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of ₹ 20 per metre leaving a space 3m wide for a gate on one side.
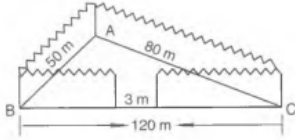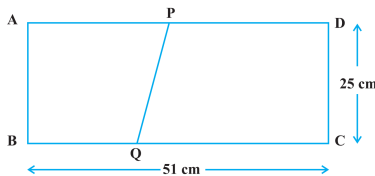

57. The sides of a triangular plot are in the ratio of 3 : 5 : 7 and its perimeter is 300 m. Find its area.

58. The area of a trapezium is 475cm^2 and the height is 19cm. Find the lengths of its two parallel sides if one side is 4cm greater than the other.

59. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13m, 14m and 15m. The advertisements yield an earning of Rs. 2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?

* **Questions with calculation. [4 Marks Each]**   **[48]**

60. The dimensions of a rectangle ABCD are 51cm × 25cm. A trapezium PQCD with its parallel sides QC and PD in the ratio 9 : 8, is cut off from the rectangle as shown in the if the area of the trapezium PQCD is $\frac{5}{6}$th part of the area of the rectangle, find the lengths QC and PD.
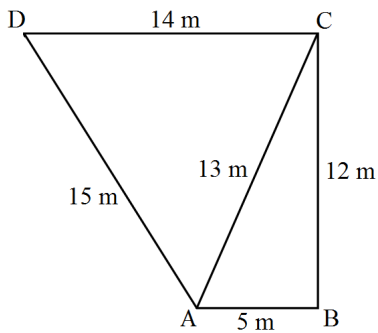

61. The perimeter of a triangular field is 420m and its sides are in the ratio 6 : 7 : 8. Find the area of the triangular field.

62. A hand fan is made by sticking 10 equal size triangular strips of two different types of paper as shown in the figure. The dimensions of equal strips are 25cm, 25cm and 14cm. Find the area of each type of paper needed to make the hand fan.


63. Find the area of the shaded region in fig. below
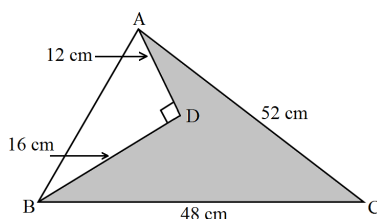
64. The perimeter of a triangular field is 240dm. If two of its sides are 78dm and 50dm, find the length of the perpendicular on the side of length 50dm from the opposite vertex.

65. The sides of a quadrilateral, taken in order as 5m, 12m, 14m, 15m respectively. The angle contained by first two sides is a right angle. Find its area.


66. The perimeter of an isosceles triangle is 42cm and its base is $\left(\frac{3}{2}\right)$ times each of the equal side. Find the length of each of the triangle, area of the triangle and the height of the triangle.

67. The perimeter of a triangullar field is 144m and the ratio of the sides is 3 : 4 : 5. Find the area of the field.

68. Find the area of the of the blades of the magnetic compass shown in Fig. below $\left(\text{Take } \sqrt{11} = 3.32\right)$.
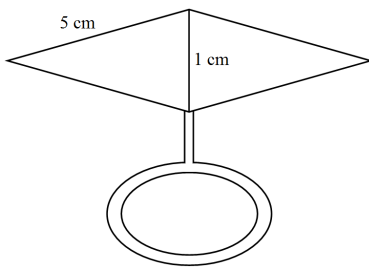
69. Find the area of quadrilateral ABCD in which AB = 42cm, BC = 21cm, CD = 29cm, DA = 34cm and the diagonal BD = 20cm.

70. The vertex A of $\triangle ABC$ is joined to a point D on the side BC. The mid-point of AD is E. Prove that $\mathrm{ar}(\triangle BEC) = \frac{1}{2}\mathrm{ar}(\triangle ABC)$.
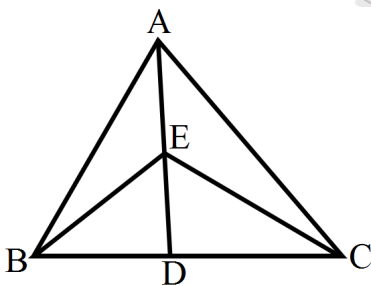

71. Calculate the area of quadrilateral ABCD, given in Figure (i).
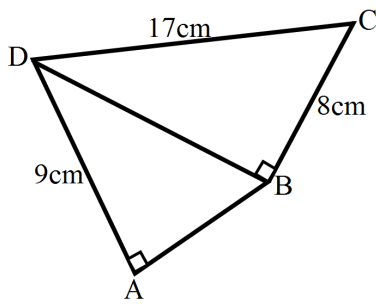
* Answer the following questions. [5 Marks Each]   [20]

72. A traffic signal board, indicating SCHOOL AHEAD, is an equilateral triangle with side a. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?

73. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (see Fig.). The advertisements yield an earning of ₹ 5000 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay?
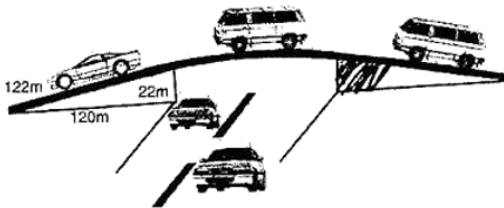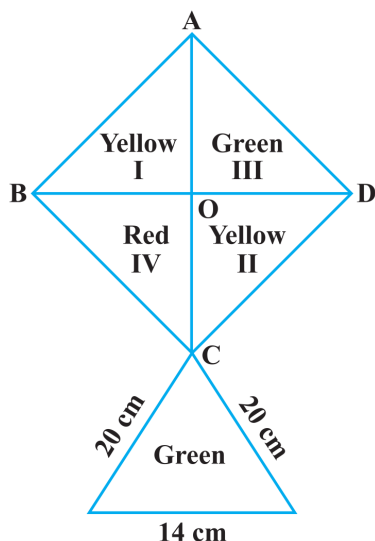

74. A design is made on a rectangular tile of dimensions 50cm × 70cm as shown in the design shows 8 triangles, each of sides 26cm, 17cm and 25cm. Find the total area of the design and the remaining area of the tile.
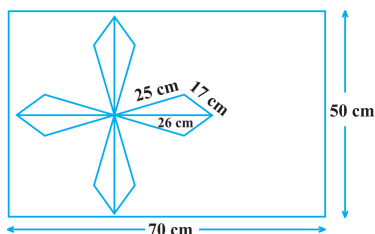
75. How much paper of each shade is needed to make a kite given in which ABCD is a square with diagonal 44cm.
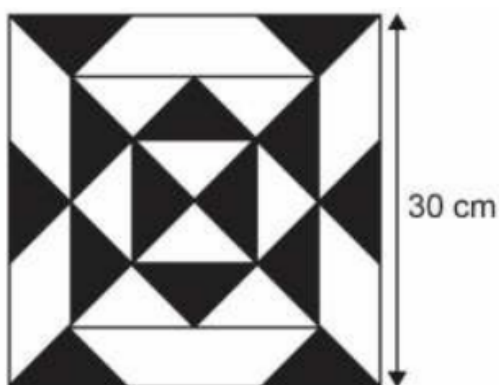
* **Case study based questions.** [12]

76. The design on a tile is made of isosceles triangles.
The side lengths of the triangles are 6 cm, 6 cm and 8 cm.

5. How much area of the tile is black?

  A. 24 cm²

  B. 9√7 cm²

  C. 90 cm²

  D. 112√5 cm²

6. A tile is made by joining the vertices of four equilateral triangles. The side length of the triangles is 15 cm. What is the area of the tile?

77. A zoo is in the shape of an isosceles trapezium.
It is divided into three zones – Zone 1, Zone 2 and Zone 3.
Animals are kept without cages in Zone 1. Zone 2 is for visitors and Zone 3 is reserved for park
authorities.
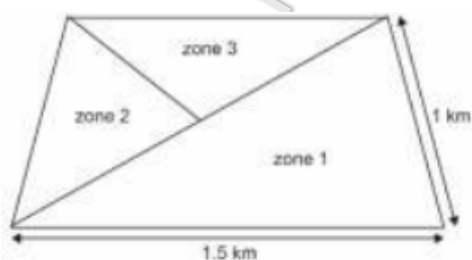
To avoid the entry of animals in zones 2 and 3, a 1.8 km long wired fencing is installed.

7. Which of the following calculations shows the area for animals?

  A. √1.35×0.65×1.15

  B. 2.15×0.35×0.65×1.15

  C. √3.15×1.35×1.65×1.15

  D. √4.30×1.35×0.65×1.15

8. "The area reserved for animals is twice the area reserved for the zoo authorities." Do you have enough information to support this statement? Explain your answer.

78. The outer boundary of Zone 1 is made of solid structures in the shape of isosceles triangles of the same size and barbed wires.

The wall consists of 15 such solid structures.

9. Which of the following calculations shows the total area (in square meters) of the solid structures?

  A. √50× 50 ×30

  B. √130×50×50×30

  C. 15√130×50×50×30

  D. 15√260×180×180×16

10. What is the area of a triangle with side lengths 20 cm, 20 cm and 8 cm?

----- "Our greatest glory is not in never falling, but in rising every time we fall." -----