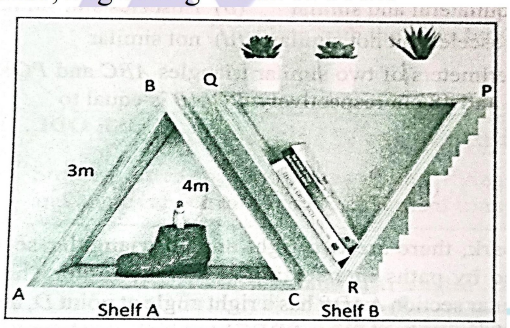
NEW STANDARD ACADEMY

Marks: 80

Date : 17-11-25 **CLASS : 10TH MATH'S** **Time: 3 hours.**

SECTION A

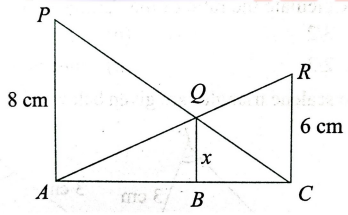
1. While browsing through catalogue of wooden shelves, Ramprasad came across these two beautiful triangular shaped shelf. In these two triangular shelves, Shelf 4 and Shelf B are similar with the sides of Shelf B twice as long as those of Shelf A. Shelf A has a right angle at B and sides 3 m and 4 m long. If the books are lying on the hypotenuse of the Shelf B, the find the length of the longest book that bits on that side, neglecting width of book.



(a) 5m (b) 10m
(c) 15m (d) 20 m

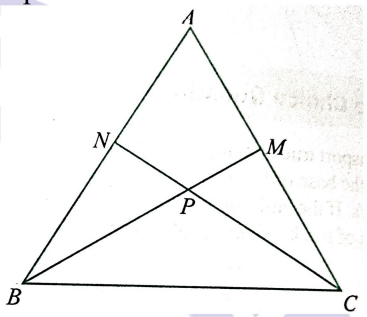
2. In a set of two similar triangles, triangle PQR and triangle XYZ have a scale factor of 4. 7 Given this information, which of the following statements is/are true?
(a) The ratio of their perimeter is 12.7
(b) The ratio of their altitudes is 4.7
(c) The ratio of their medians is 27
(d) The ratio of their angle bisectors is 4.7

3. In a park, a triangular flower bed is designed having three paths PA. QB, and RC, each perpendicular to the side AC of the triangle as shown below. The lengths of the paths PA and RC are given as 8 cm and 6 cm respectively. Then the length of the path QB is



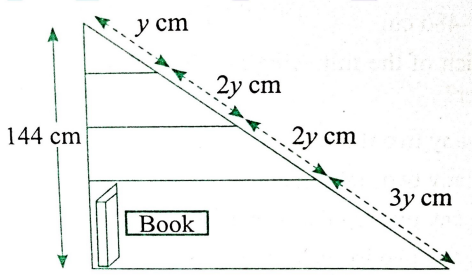
(a) 56/7 cm (b) 7/56 cm
(c) 25/7 cm (d) 24/7 cm

4. 12. In the given figure, AM: MC=3:4, BP: PM = 3:2 and BN = 12 cm. Then AN is equal to



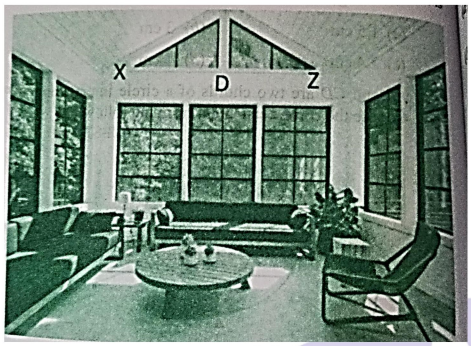
(a) 24 cm (b) 12 cm
(c) 24 cm (d) 22 cm

5. Leela has a triangular cabinet that fits under his staircase. There are four parallel shelves as shown below.



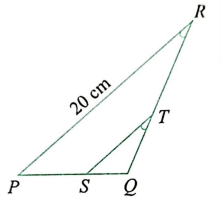
The total height of the cabinet is 144 cm. What is the maximum height of a book that can stand upright on the bottom-most shelf?
(a) 18 cm (c) 54 cm
(b) 36 cm (d) 86.4 cm

6. An architect designed this triangular shaped window for a chapel. In the window, the triangle XYZ is right angled at Y. The window is designed such that the ratio of XY to YZ is 3: 4. The architect also add brace YD to support the structure which is perpendicular to XZ. If the total length of the hypotenuse XZ is 20 m, then the length of the is brace

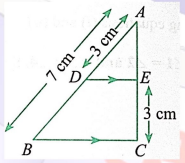


(a) 6 m (b) 9.6 m
(c) 10.2 m (d) 12 m

7. Which of the following are DEFINITELY similar to each other?
(a) any two rhombuses
(b) any two right triangles
(c) any two regular pentagons
(d) any two isosceles triangles
8. All circles and Squares are
(a) Congruent (b) Similar (c) Both(a) and (b) (d) None of these
9. ΔPQR is shown below .ST is drawn such that $\angle PRQ = \angle STQ$

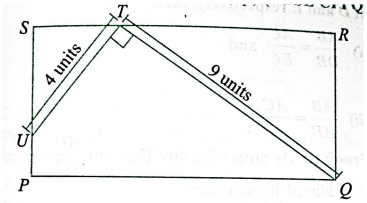


If ST divides QR in a ratio of 2 : 3, then what is the length of ST
(a) $\frac{10}{3}$ cm (b) 8 cm (c) 12 Cm
(d) $\frac{40}{3}$ cm
10. In the figure, DE || BC. If AD = 3 cm, AB = 7cm and EC = 3cm then the length of AE is:

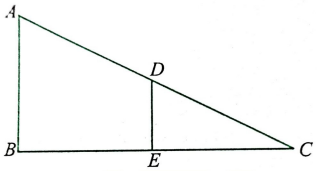


(a) 2 cm (b) 2.25 cm (c) 3.5 cm
(d) 4 cm
11. In a ABC, AD is the bisector of ∠BAC . If AB = 8 cm, BD = 6 cm and DC = 3 cm. Then the value of AC is
(a) 4 cm (b) 6 cm (c) 5 cm
(d) 8 cm
12. Shown below is a rectangle PQRS. ∠UTQ is a right angle.

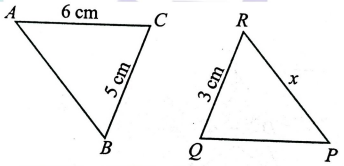
Which of these is TRUE about UST and TRQ?



(a) The perimeters are in the ratio 16:81.
(b) The ratio of SUT: ZRTQ is 4:9.
(c) The ratio of US:TR is 4:9.
(d) The ratio of US:QR is 4:9.
13. In triangle ABC DE || AB. If AB = a DE = x BE = b and EC = c Then x expressed in terms of a, b and c is:

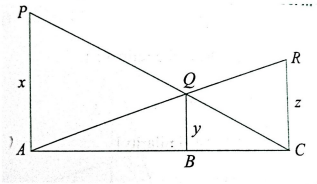


(a) $\frac{ac}{b}$ (b) $\frac{ac}{b+c}$ (c) $\frac{ab}{c}$
(d) $\frac{ab}{b+c}$
14. In the given figure, ΔABC ~ ΔQPR , If AC = 6 cm, BC = 5cm QR = 3cm and PR = x then the value of x is:



(a) 3.6 cm (b) 2.5 cm (c) 10 cm
(d) 3.2 cm
15. In ΔABC DE is parallel to BC, with D on AB and EO AC. If $\frac{AD}{DB} = \frac{3}{4}$, then $\frac{BC}{DC}$ is
(a) 2:5 (b) 3:7 (c) 7:3
(d) 5:3
16. In a ΔABC ,∠ A = x^0 , ∠B = $(3x - 2)^0$, ∠C = y^0 , Also ∠C- ∠B = 9^0The sum of the greatest and the smallest angles of this triangle is
(a) 107° (b) 135° (c) 155° (d) 145°
17. In ΔABC and triangle DEF , ∠F = ∠C, ∠B = ∠E and Then, the two triangles are AB = 1/2 DE
(a) Congruent, but not similar (b) Similar, but not congruent
(c) Neither congruent nor similar (d) Congruent as well as similar

18. In fig., PA, QB and RC are each perpendicular to AC. If x = 8 cm and z = 6 cm, then y is equal to



(a) $\frac{56}{7}\ cm$ (b) $\frac{7}{56}\ cm$

(c) $\frac{25}{7}\ cm$ (d) $\frac{24}{7}$ cm

Assertion and Reason

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). M the correct choice as.

(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

19. Assertion (A): triangle ABC is an isosceles triangle right angled at C, then $AB^2 = 2AC^2$

Reason (R): In right ΔABC right angled at B, $AC^2 = AB^2 + BC^2$.

20. Assertion (A): If in a ΔABC, a line DE || BC, intersects AB in D and AC in E, then AB/AC = AD/AE

Reason (R): If a line is drawn parallel to one side of a triangle intersecting the other two sides, then the other two sides are divided in the same ratio.

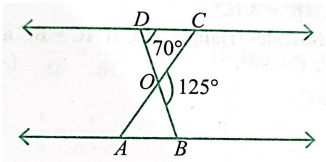
SECTION-B

This section has 5 Very Short Answer (VSA) type questions carrying 2 marks each.

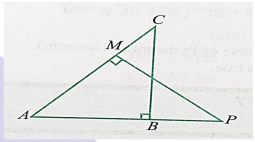
21. Using Converse of basic proportionality theorem, prove that the line joining the mid-points of any two sides of a triangle is parallel to the third side.

22. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that ΔABE ~ΔCFB.

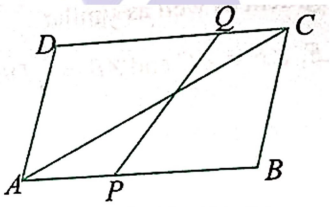
23. In the figure, ΔODC ~ ΔOBA , ∠BOC = 125^0 and ∠CDO =70^0 Find ∠DOC



24. In the given figure, ABC and AMP are two right triangles, right angled at B and M respectively, prove that Δ ABC ~ΔAMP

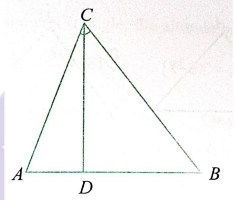


25. ABCD is a parallelogram. Point P divides 4B in the ratio 2 : 3 and point Q divides DC In the ratio 4 ; 1. Prove that OCis half of OA.

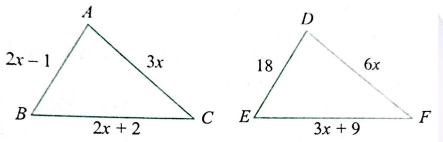


SECTION – C

26. In fig.,$\angle ACB = 90^0$ CD $\perp AB$, prove that CD^2 = BD× AD.



27. In Fig. if ΔABC ~ΔDEF and their sides of lengths (in cm) are marked along them, then find the lengths of sides of each triangle.



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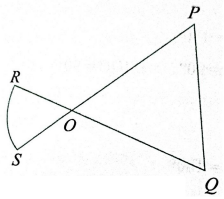
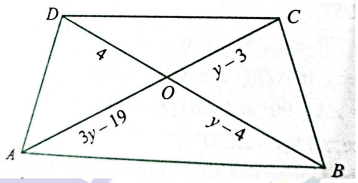


In a mystical realm, a wizard draws a triangle OPQ in which OP and OQ are

equal in length and an arc RS on a magical circle with the center at O. The wizard claims that triangle OSR is similar to triangle OPQ . Is the wizard's claim correct?

29. In ΔABC DE is parallel to BC and intersects AB and AC at D and E respectively, then
(i) AB/DB = AC/EC and
(ii) AB/AD = AC/AE

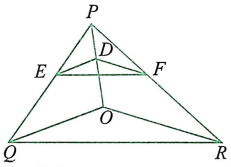
30. In the given figure ,AB||CD.Find the value of y



31. Prove that the line segments joining the midpoints of the adjacent sides of a quadrilateral form a parallelogram

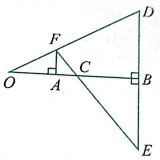
SECTION-D

32. In the figure, DE|OQ and DF|OR. Show that EF||QR.

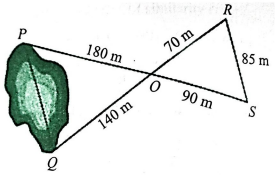


33. Sides AB and AC and median AD to ΔABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that ΔABC ~ ΔPQR.

34. In Fig, OB is the perpendicular bisector of the line segment DE, FA⊥ OB and FE intersects OB at the point C. Prove that 1/OA + 1/OB = 2/OC



35. A geologist asked his assistant Nidhi, if the length of the lake, PQ, can be found from the information shows below.

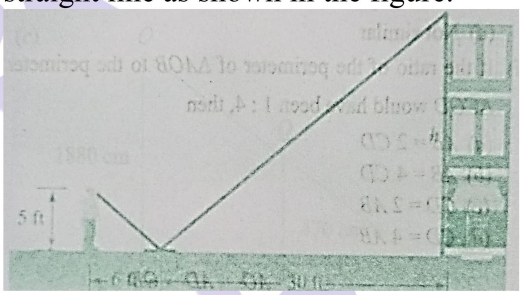


Nidhi said, "It is possible to find the length of the lake, PQ."
Is Nidhi's statement correct? Justify your answer with valid reasons.

SECTION -E

Case Based Questions

36. Case Based-I: Aruna visited to her uncle's house. From a point A. where Aruna was standing, a bus and building come in a straight line as shown in the figure.

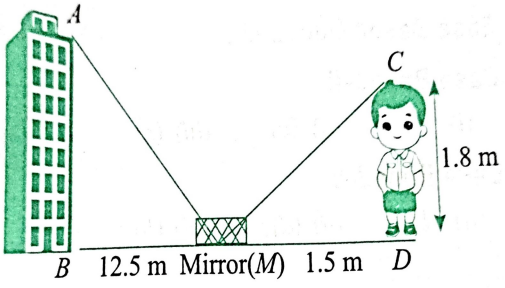


Based on the above information, answer the following questions.
(i) Which similarity criteria can be seen in this case, if bus and building are considered in a straight line?
(ii) If the distance between Aruna and the bus is twice as much as the height of the bus, then find the height of the bus.

OR

If the distance of Aruna from the building is twelve times the height of the bus, then find the ratio of the heights of bus and building.
(iii) What is the ratio of the distance between Aruna and the top of the bus to the distance between the tops of the bus and the building?

37. Rohit's dad, who is good at mathematics, gave him a fun task to measure a building's height. Rohit used a mirror on the ground for this task. He stood at a spot where he could see the top of the building in the mirror. Rohit's eyes are 1.8 meters above the ground. He is standing 1.5 meters away from the mirror, and the building is 2.5 meters away from the mirror.



Based on the above information, answer the following questions:
(i) Apply your understanding of similar triangles and proportions to determine the height of the building.
(ii) Use your knowledge of angles in triangles to find the value of ∠MCD given that in ΔABM ∠BAM = 30°
(iii) If ΔABM and ΔCDM are similar, with CD = 6 cm, MD = 8 cm, and BM = 24 cm, calculate the length of AB.

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RAE BARELI
अमृतं तु विद्या