Mathematics Part II (Geometry)

SSC Board Exam March 2027 – Practice Paper No. 2

Model Answer Paper

Time: 2 hours **Max. Marks: 40**

Model answers show one correct method; any other correct method gets full marks.

Q.1 (A) Four alternative answers are given for every sub-question. Select the correct alternative and write its alphabet with the sub-question number. **[4]**

(i) Two triangles have equal heights. Their bases are 6 cm and 15 cm. What is the ratio of their areas?

(A) 4 : 25 (B) 2 : 5

(C) 5 : 2 (D) 3 : 5

Answer (1 mark)
(B) 2 : 5
Areas of triangles with equal heights are proportional to their bases: 6 : 15 = 2 : 5.

(ii) In △PQR, ∠Q = 90° and ∠P = 45°. If PR = $6\sqrt{2}$ cm, what is the length of side PQ?

(A) $6\sqrt{2}$ cm (B) 3 cm

(C) 6 cm (D) 12 cm

Answer (1 mark)
(C) 6 cm
∠R = 180° − 90° − 45° = 45°, so by the 45°-45°-90° theorem PQ = $(1/\sqrt{2}) \times PR = (1/\sqrt{2}) \times 6\sqrt{2} = 6$ cm.

(iii) Line l touches a circle at point A. Chord AB makes an angle of 48° with line l. What is the measure of the arc intercepted by this angle?

(A) 48° (B) 24°

(C) 96° (D) 132°

Answer (1 mark)
(C) 96°
By the theorem of angle between tangent and secant, the angle is half the measure of the arc intercepted by it. ∴ Measure of the arc = 2 × 48° = 96°.

(iv) The radius of a circle is 9 cm. What is the length of an arc of this circle whose measure is 40°?

(A) π cm (B) 2π cm

(C) 4π cm (D) 9π cm

Answer (1 mark)
(B) 2π cm
Length of arc = $(\theta/360) \times 2\pi r = (40/360) \times 2\pi \times 9 = 2\pi$ cm.

Q.1 (B) Solve the following sub-questions. **[4]**

(i) Find the co-ordinates of the midpoint of the segment joining the points (−3, 8) and (7, 2).

Answer (1 mark)
By midpoint formula, midpoint = ((−3 + 7)/2, (8 + 2)/2) = (4/2, 10/2)
∴ The co-ordinates of the midpoint are (2, 5).

(ii) Find the value of $5 \sin^2 37° + 5 \cos^2 37°$.

Answer (1 mark)
$5 \sin^2 37° + 5 \cos^2 37° = 5(\sin^2 37° + \cos^2 37°) = 5 \times 1$ ...$(\sin^2\theta + \cos^2\theta = 1)$
$\therefore 5 \sin^2 37° + 5 \cos^2 37° = 5$

(iii) In △PQR, ray QS bisects ∠PQR and point S lies on side PR. If PQ = 8, QR = 10 and PS = 4, find SR.

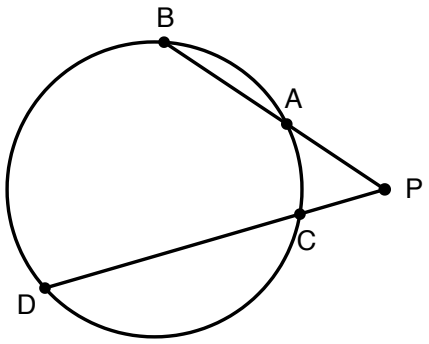
Answer (1 mark)
By the property of an angle bisector of a triangle, PQ/QR = PS/SR
∴ 8/10 = 4/SR
∴ SR = (4 × 10)/8 = 5

(iv) The area of the base of a cone is 45 cm^2 and its height is 8 cm. Find the volume of the cone.

Answer (1 mark)
Volume of cone = (1/3) × area of base × height = (1/3) × 45 × 8
∴ Volume of the cone = 120 cm^3

Q.2 (A) Complete any two activities and rewrite them. **[4]**

(i) In the figure, secants containing chords AB and CD of a circle intersect each other at point P outside the circle. If PA = 4, AB = 5 and PC = 3, complete the following activity to find CD.
Activity: PB = PA + AB = 4 + 5 = 9
PA × PB = PC × ☐ ...(☐)
∴ 4 × 9 = 3 × PD
∴ PD = ☐
∴ CD = PD − PC = ☐



Answer (2 marks)
PB = PA + AB = 4 + 5 = 9
PA × PB = PC × **PD** ...(**Theorem of external division of chords**)
∴ 4 × 9 = 3 × PD
∴ PD = 36/3 = **12**
∴ CD = PD − PC = 12 − 3 = **9**

Marking: Each correctly filled box – ½ mark (4 boxes × ½ = 2 marks)

Examiner tip: Measure both secant segments from the outside point P (PA and PB, PC and PD), not the chord lengths AB and CD.

(ii) If 35 sin θ = 12 cos θ and θ is an acute angle, complete the following activity to find sec θ and cos θ.

Activity: 35 sin θ = 12 cos θ

∴ sin θ/cos θ = 12/35

∴ tan θ = ☐

Now, $1 + \tan^2\theta =$ ☐ ...(Trigonometric identity)

∴ $\sec^2\theta = 1 + 144/1225 =$ ☐

∴ sec θ = 37/35 ...(θ is acute)

∴ cos θ = ☐

Answer (2 marks)

35 sin θ = 12 cos θ

∴ sin θ/cos θ = 12/35

∴ tan θ = **12/35**

Now, $1 + \tan^2\theta =$ **$\sec^2\theta$** ...(Trigonometric identity)

∴ $\sec^2\theta = 1 + 144/1225 =$ **1369/1225**

∴ sec θ = 37/35 ...(θ is acute)

∴ cos θ = 1/sec θ = **35/37**

Marking: Each correctly filled box – ½ mark (4 boxes × ½ = 2 marks)

Examiner tip: √1369 = 37 and √1225 = 35. cos θ is the reciprocal of sec θ – do not write 37/35 for cos θ.

(iii) In the figure, in △ABC, ∠ACB is an acute angle and seg AD ⊥ side BC. If BC = 17, AC = 25 and DC = 7, complete the following activity to find AB.

Activity: In △ABC, ∠C is acute and seg AD ⊥ side BC.

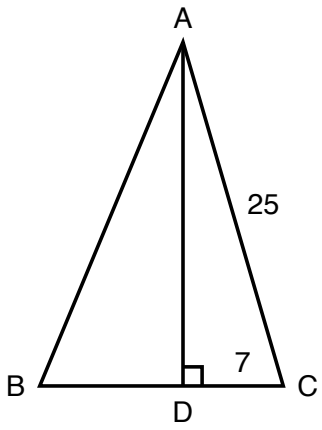
∴ $AB^2 = BC^2 + AC^2 - 2BC \times$ ☐ ...(Application of Pythagoras theorem)

∴ $AB^2 = 17^2 + 25^2 - 2 \times 17 \times 7$

∴ $AB^2 = 289 + 625 -$ ☐

∴ $AB^2 =$ ☐

∴ AB = ☐



Answer (2 marks)

In △ABC, ∠C is acute and seg AD ⊥ side BC.

∴ $AB^2 = BC^2 + AC^2 - 2BC \times$ **DC** ...(Application of Pythagoras theorem)

∴ $AB^2 = 17^2 + 25^2 - 2 \times 17 \times 7$

$\therefore AB^2 = 289 + 625 - \mathbf{238}$

$\therefore AB^2 = \mathbf{676}$

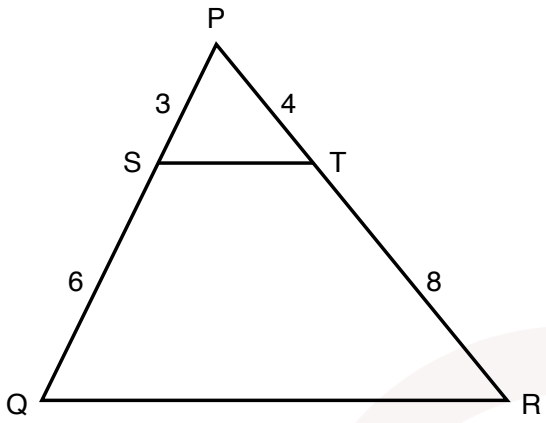
$\therefore AB = \mathbf{26}$

Marking: Each correctly filled box – ½ mark (4 boxes × ½ = 2 marks)

Examiner tip: For the side opposite an acute angle the term 2BC × DC is subtracted; for an obtuse angle it is added.

Q.2 (B) Solve any four of the following sub-questions. **[8]**

(i) In the figure, point S lies on side PQ and point T lies on side PR of △PQR. If PS = 3, SQ = 6, PT = 4 and TR = 8, is seg ST ∥ side QR? Give reason.



Answer (2 marks)

PS/SQ = 3/6 = 1/2 ...(I)

PT/TR = 4/8 = 1/2 ...(II)

From (I) and (II), PS/SQ = PT/TR

∴ seg ST ∥ side QR ...(Converse of basic proportionality theorem)

Marking: PS/SQ = 1/2 – ½ mark · PT/TR = 1/2 – ½ mark · Conclusion ST ∥ QR with reason (converse of basic proportionality theorem) – 1 mark

Examiner tip: The reason is the CONVERSE of the basic proportionality theorem, because we are proving the lines parallel.

(ii) A rectangular iron gate is 1.5 m wide and 2 m high. To make it strong, a straight iron bar is fixed along one of its diagonals. Find the length of the bar.

Answer (2 marks)

Let □ABCD be the gate with AB = 1.5 m, BC = 2 m and diagonal AC = length of the bar.

In △ABC, ∠ABC = 90° ...(angle of a rectangle)

By Pythagoras theorem,

$AC^2 = AB^2 + BC^2 = 1.5^2 + 2^2 = 2.25 + 4 = 6.25$

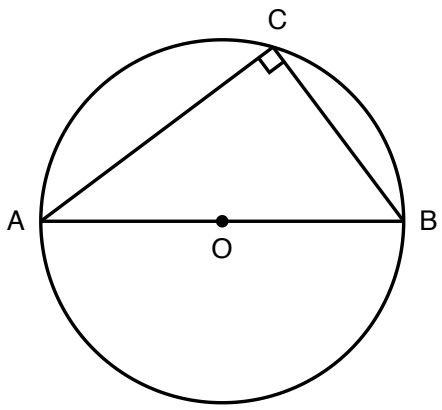
$\therefore AC = 2.5$

∴ The length of the iron bar is 2.5 m.

Marking: Using Pythagoras theorem with right angle – ½ mark · Substitution – ½ mark · $AC^2 = 6.25$ – ½ mark · Length 2.5 m – ½ mark

Examiner tip: $\sqrt{6.25} = 2.5$; write the unit (m) in the final answer.

(iii) In the figure, seg AB is a diameter of the circle with centre O. Point C lies on the circle. If AC = 16 cm and BC = 12 cm, find the radius of the circle.



Answer (2 marks)

$\angle ACB = 90°$ ...(Angle inscribed in a semicircle is a right angle)

In $\triangle ACB$, by Pythagoras theorem,

$AB^2 = AC^2 + BC^2 = 16^2 + 12^2 = 256 + 144 = 400$

$\therefore AB = 20$ cm

Radius = AB/2 = 20/2

$\therefore$ Radius of the circle = 10 cm

Marking: $\angle ACB = 90°$ with reason – ½ mark · Pythagoras theorem and substitution – ½ mark · AB = 20 cm – ½ mark · Radius = 10 cm – ½ mark

Examiner tip: AB is the diameter; halve it to get the radius.

(iv) A circle has its centre at O(2, −3) and passes through the point P(7, 9). Find the radius of the circle. If seg PQ is a diameter of this circle, find the co-ordinates of point Q.

Answer (2 marks)

Radius = $OP = \sqrt{[(7-2)^2 + (9-(-3))^2]} = \sqrt{(25 + 144)} = \sqrt{169} = 13$

$\therefore$ Radius = 13 units

Seg PQ is a diameter, so O is the midpoint of seg PQ. Let Q be (x, y).

$(7 + x)/2 = 2 \Rightarrow x = -3$ and $(9 + y)/2 = -3 \Rightarrow y = -15$

$\therefore$ Q is (−3, −15).

Marking: Distance formula and substitution – ½ mark · Radius = 13 units – ½ mark · Using midpoint formula – ½ mark · Q(−3, −15) – ½ mark

Examiner tip: The centre is the midpoint of any diameter; take care with the signs when solving for x and y.

(v) The area of a sector of a circle of radius 14 cm is 154 cm^2. Find the length of the arc of this sector.

Answer (2 marks)

r = 14 cm, A = 154 cm^2

Area of sector = (Length of arc × Radius)/2

$\therefore 154 = (l \times 14)/2$

$\therefore 154 = 7l$

$\therefore l = 22$

$\therefore$ Length of the arc = 22 cm

Marking: Formula $A = (l \times r)/2$ – ½ mark · Substitution – ½ mark · Simplification – ½ mark · l = 22 cm – ½ mark

Examiner tip: The relation $A = lr/2$ avoids finding the angle first. (Students who first find $\theta = 90°$ and then the arc length also get full marks.)

Q.3 (A) Complete any one activity of the following and rewrite it. **[3]**

(i) Complete the following activity to show that the points P(−1, 1), Q(4, 2), R(6, 6) and S(1, 5) are the vertices of a parallelogram.

Activity: Slope of line PQ = (2 − 1)/(4 − (−1)) = ☐ ...(I)

Slope of line QR = (6 − 2)/(6 − 4) = ☐ ...(II)

Slope of line RS = (5 − 6)/(1 − 6) = 1/5 ...(III)

Slope of line SP = (1 − 5)/(−1 − 1) = ☐ ...(IV)

From (I) and (III), slope of line PQ = slope of line RS

∴ line PQ ∥ line ☐

From (II) and (IV), slope of line QR = slope of line SP

∴ line QR ∥ line SP

Both pairs of opposite sides of □PQRS are parallel.

∴ □PQRS is a ☐.

Answer (3 marks)

Slope of line PQ = (2 − 1)/(4 − (−1)) = **1/5** ...(I)

Slope of line QR = (6 − 2)/(6 − 4) = **2** ...(II)

Slope of line RS = (5 − 6)/(1 − 6) = 1/5 ...(III)

Slope of line SP = (1 − 5)/(−1 − 1) = −4/−2 = **2** ...(IV)

From (I) and (III), slope of line PQ = slope of line RS

∴ line PQ ∥ line **RS**

From (II) and (IV), slope of line QR = slope of line SP

∴ line QR ∥ line SP

Both pairs of opposite sides of □PQRS are parallel.

∴ □PQRS is a **parallelogram**.

Marking: 1/5 – ½ mark · 2 (slope of QR) – ½ mark · 2 (slope of SP) – ½ mark · RS – ½ mark · parallelogram – 1 mark

Examiner tip: (1 − 5)/(−1 − 1) = (−4)/(−2) = 2: two negatives give a positive slope.

(ii) Complete the following activity to prove that (1 + sec θ)(1 − cos θ) = sin θ tan θ.

Activity: LHS = (1 + sec θ)(1 − cos θ)

= 1 − cos θ + sec θ − sec θ cos θ

= 1 − cos θ + sec θ − ☐ ...(∵ sec θ × cos θ = 1)

= sec θ − cos θ

= 1/cos θ − cos θ

= ☐/cos θ

= ☐/cos θ ...(∵ $\sin^2\theta + \cos^2\theta = 1$)

= sin θ × ☐

= sin θ tan θ

= RHS

Answer (3 marks)

LHS = (1 + sec θ)(1 − cos θ)

= 1 − cos θ + sec θ − sec θ cos θ

= 1 − cos θ + sec θ − **1** ...(∵ sec θ × cos θ = 1)

= sec θ − cos θ

= 1/cos θ − cos θ

= **(1 − $\cos^2\theta$)**/cos θ

= **$\sin^2\theta$**/cos θ ...(∵ $\sin^2\theta + \cos^2\theta = 1$)

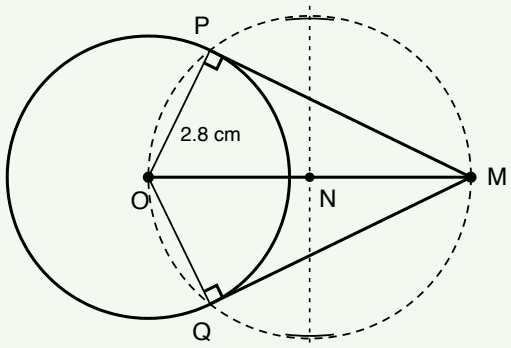
= sin θ × **(sin θ/cos θ)**
= sin θ tan θ
= RHS
∴ (1 + sec θ)(1 − cos θ) = sin θ tan θ. Hence proved.

Marking: 1 – ½ mark · $(1 - \cos^2\theta)$ – 1 mark · $\sin^2\theta$ – 1 mark · sin θ/cos θ – ½ mark
Examiner tip: Expand all four terms carefully; sec θ × cos θ = 1 is the step that makes the 1's cancel.

Q.3 (B) Solve any two of the following sub-questions. **[6]**

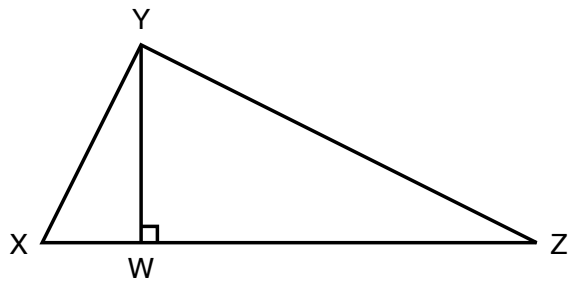
(i) Draw a circle with centre O and radius 2.8 cm. Take a point M at a distance of 6.4 cm from the centre. Draw tangents to the circle from point M.

Answer (3 marks)
Analysis: If MP is a tangent at P, then ∠OPM = 90° ...(Tangent theorem). So P lies on the circle with diameter OM (angle inscribed in a semicircle). Hence draw the circle with seg OM as diameter; it cuts the given circle at the points of contact.
Steps of construction:
1. Draw a circle with centre O and radius 2.8 cm.
2. Take point M such that OM = 6.4 cm and draw seg OM.
3. Draw the perpendicular bisector of seg OM and name the midpoint of OM as N.
4. With centre N and radius NO (= 3.2 cm), draw a circle. It intersects the given circle at points P and Q.
5. Draw lines MP and MQ.
Lines MP and MQ are the required tangents. (On measuring, MP = MQ ≈ 5.8 cm.)



Marking: Circle of radius 2.8 cm and point M with OM = 6.4 cm – 1 mark · Perpendicular bisector of OM, midpoint N and circle with diameter OM – 1 mark · Tangents MP and MQ drawn and named – 1 mark
Examiner tip: Keep the construction arcs of the perpendicular bisector; examiners award marks for them.

(ii) In the figure, in △XYZ, ∠XYZ = 90° and seg YW ⊥ side XZ. If XW = 4 and WZ = 16, find YW, XY and YZ.



Answer (3 marks)

In $\triangle XYZ$, $\angle XYZ = 90°$ and seg YW $\perp$ hypotenuse XZ.

$\therefore YW^2 = XW \times WZ$ ...(Theorem of geometric mean)

$\therefore YW^2 = 4 \times 16 = 64$

$\therefore YW = 8$

In $\triangle XWY$, $\angle XWY = 90°$, by Pythagoras theorem,

$XY^2 = XW^2 + YW^2 = 16 + 64 = 80$

$\therefore XY = \sqrt{80} = 4\sqrt{5}$

In $\triangle YWZ$, $\angle YWZ = 90°$, by Pythagoras theorem,

$YZ^2 = YW^2 + WZ^2 = 64 + 256 = 320$

$\therefore YZ = \sqrt{320} = 8\sqrt{5}$

$\therefore YW = 8$, $XY = 4\sqrt{5}$ and $YZ = 8\sqrt{5}$

Marking: YW = 8 using theorem of geometric mean – 1 mark · XY = $4\sqrt{5}$ – 1 mark · YZ = $8\sqrt{5}$ – 1 mark

Examiner tip: Check: $XY^2 + YZ^2 = 80 + 320 = 400 = 20^2 = XZ^2$, so the answers are consistent.

(iii) A straight ramp is built so that loaded trolleys can be pushed up onto a loading platform 0.75 m high. The ramp makes an angle of 30° with the horizontal ground. Find the length of the ramp and the horizontal distance it covers on the ground. ($\sqrt{3} = 1.73$)

Answer (3 marks)

In the figure, AC is the ramp, AB = 0.75 m is the height of the platform, BC is the horizontal distance, $\angle ABC = 90°$ and $\angle ACB = 30°$.

In right-angled $\triangle ABC$,

$\sin 30° = AB/AC$

$\therefore 1/2 = 0.75/AC$

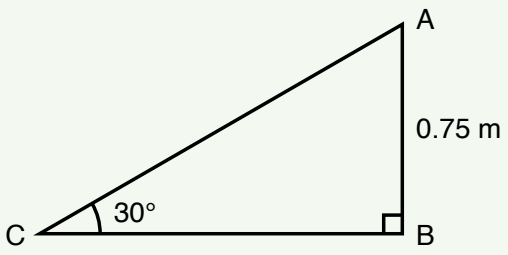
$\therefore AC = 2 \times 0.75 = 1.5$ m

$\tan 30° = AB/BC$

$\therefore 1/\sqrt{3} = 0.75/BC$

$\therefore BC = 0.75\sqrt{3} = 0.75 \times 1.73 = 1.2975 \approx 1.30$ m

$\therefore$ Length of the ramp = 1.5 m and horizontal distance $\approx$ 1.30 m.



Marking: Figure with right angle and 30° – 1 mark · Length of ramp AC = 1.5 m – 1 mark · Horizontal distance BC = $0.75\sqrt{3} \approx 1.30$ m – 1 mark

Examiner tip: Use sin for the length (hypotenuse) and tan for the horizontal side; writing BC = $0.75\sqrt{3}$ m is also accepted.

(iv) A plastic flower-pot is in the shape of a frustum of a cone. The radii of its top and bottom are 18 cm and 12 cm and its height is 14 cm. How many litres of soil will fill the pot to the brim? ($\pi = 22/7$, 1 litre = 1000 cm^3)

Answer (3 marks)

$r_1 = 18$ cm, $r_2 = 12$ cm, $h = 14$ cm

Volume of frustum $= (1/3)\pi h(r_1^2 + r_2^2 + r_1 \times r_2)$

$= (1/3) \times (22/7) \times 14 \times (18^2 + 12^2 + 18 \times 12)$

$= (1/3) \times 44 \times (324 + 144 + 216)$

$= (1/3) \times 44 \times 684$

$= 44 \times 228$

$= 10032\ cm^3$

= 10032/1000 litres = 10.032 litres

∴ The pot holds 10.032 litres of soil.

Marking: Formula of volume of frustum – 1 mark · Substitution and volume 10032 cm^3 – 1 mark · 10.032 litres – 1 mark

Examiner tip: The frustum formula has three terms: r_1^2, r_2^2 AND $r_1 \times r_2$; students often forget the product term.

Q.4 Solve any two of the following sub-questions. **[8]**

(i) Prove that if a line parallel to a side of a triangle intersects the remaining sides in two distinct points, then the line divides the sides in the same proportion.

Answer (4 marks)

Given: In △PQR, line l ∥ side QR, and line l intersects side PQ and side PR in points X and Y respectively.

To prove: PX/XQ = PY/YR

Construction: Draw seg XR and seg QY.

Proof: △PXY and △XQY have equal heights (the common vertex Y and bases PX and XQ on the same line PQ).

∴ A(△PXY)/A(△XQY) = PX/XQ ...(I) (Areas proportional to bases)

Similarly, △PXY and △YXR have equal heights (common vertex X, bases PY and YR on line PR).

∴ A(△PXY)/A(△YXR) = PY/YR ...(II) (Areas proportional to bases)

Seg XY is the common base of △XQY and △YXR, and seg XY ∥ side QR.

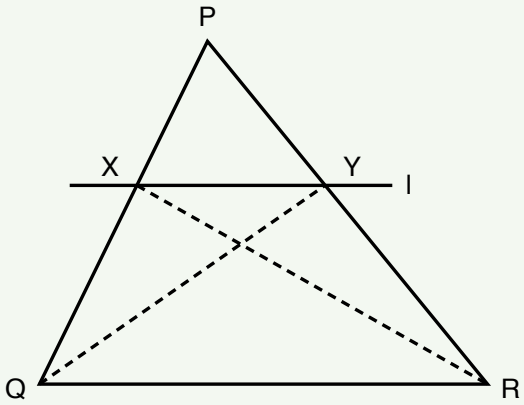
∴ △XQY and △YXR have equal heights.

∴ A(△XQY) = A(△YXR) ...(III)

∴ A(△PXY)/A(△XQY) = A(△PXY)/A(△YXR) ...[from (I), (II) and (III)]

∴ PX/XQ = PY/YR ...[from (I) and (II)]

Hence proved. (This is the basic proportionality theorem.)



Marking: Figure – 1 mark · Given, To prove and construction – 1 mark · Ratios (I) and (II) with reason – 1 mark · Equal areas (III) and conclusion – 1 mark

Examiner tip: Do not forget the construction (seg XR and seg QY); without it the area ratios cannot be written.

(ii) The vertices of △ABC are A(10, 13), B(−3, 4) and C(5, −2). Seg AD is a median of △ABC and G is its centroid.
(a) Find the co-ordinates of D and the length of median AD.
(b) Find the co-ordinates of G.
(c) Verify that AG : GD = 2 : 1.

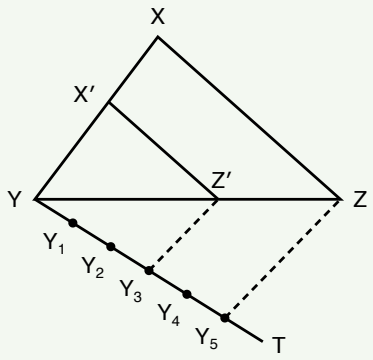
Answer (4 marks)
(a) Seg AD is a median, so D is the midpoint of seg BC.
D = ((−3 + 5)/2, (4 + (−2))/2) = (2/2, 2/2) = (1, 1)
AD = $\sqrt{[(10 - 1)^2 + (13 - 1)^2]}$ = $\sqrt{(81 + 144)}$ = $\sqrt{225}$ = 15 units
(b) By centroid formula,
G = ((10 + (−3) + 5)/3, (13 + 4 + (−2))/3) = (12/3, 15/3) = (4, 5)
(c) AG = $\sqrt{[(10 - 4)^2 + (13 - 5)^2]}$ = $\sqrt{(36 + 64)}$ = $\sqrt{100}$ = 10
GD = $\sqrt{[(4 - 1)^2 + (5 - 1)^2]}$ = $\sqrt{(9 + 16)}$ = $\sqrt{25}$ = 5
∴ AG : GD = 10 : 5 = 2 : 1. Hence verified.

Marking: D(1, 1) – 1 mark · AD = 15 units – 1 mark · G(4, 5) – 1 mark · AG = 10, GD = 5 and AG : GD = 2 : 1 – 1 mark

Examiner tip: A median joins a vertex to the MIDPOINT of the opposite side; find D first, then use the centroid formula with all three vertices.

(iii) △XYZ ~ △X′YZ′. In △XYZ, XY = 5 cm, YZ = 7.5 cm and XZ = 6 cm, and YZ/YZ′ = 5/3. Construct △XYZ and △X′YZ′.

Answer (4 marks)
Analysis (rough figure): △XYZ ~ △X′YZ′, ∴ ∠XYZ ≅ ∠X′YZ′ and XY/X′Y = YZ/YZ′ = XZ/X′Z′ = 5/3. The sides of △X′YZ′ are smaller. Points X′ and Z′ lie on seg YX and seg YZ respectively, and X′Z′ ∥ XZ. (YZ′ = 4.5 cm, X′Y = 3 cm, X′Z′ = 3.6 cm.)
Steps of construction:
1. Draw seg YZ = 7.5 cm. With centre Y and radius 5 cm, and with centre Z and radius 6 cm, draw arcs intersecting at X. Join XY and XZ. △XYZ is ready.
2. Draw ray YT making an acute angle with side YZ, on the side of YZ opposite to X.
3. Starting from Y, mark 5 equal parts on ray YT: Y_1, Y_2, Y_3, Y_4, Y_5.
4. Join Y_5Z.
5. Through Y_3, draw a line parallel to Y_5Z, intersecting seg YZ at Z′.
6. Through Z′, draw a line parallel to side ZX, intersecting seg YX at X′.
△X′YZ′ is the required triangle. (On measuring, YZ′ = 4.5 cm, X′Y = 3 cm.)



Marking: Rough figure with analysis – 1 mark · Construction of △XYZ – 1 mark · 5 equal parts on ray YT and line through Y_3 parallel to Y_5Z – 1 mark · Line Z′X′ parallel to ZX and △X′YZ′ completed – 1 mark

Examiner tip: Since YZ/YZ′ = 5/3, divide the ray into 5 equal parts (the larger number), join the 5th point to Z and draw the parallel through the 3rd point.

Q.5 Solve any one of the following sub-questions. **[3]**

(i) In a science exhibition, Sneha makes a pinhole camera. The pinhole O is at the same level as the foot B of a tree AB which is 6 m tall and 15 m away from the pinhole. The screen is vertical and 25 cm behind the pinhole. The image A′B′ of the tree is formed upside down on the screen, so that A, O, A′ and B, O, B′ are collinear.

(a) Draw a figure from the given information.

(b) Name the similar triangles and write the test of similarity.

(c) Find the height of the image A′B′ in cm.

Answer (3 marks)

(a) In the figure, AB = 6 m is the tree, O is the pinhole, A′B′ is the image on the screen; BO = 15 m, OB′ = 25 cm = 0.25 m.

(b) In △ABO and △A′B′O,

∠ABO ≅ ∠A′B′O ...(each 90°: the tree and the screen are vertical)

∠AOB ≅ ∠A′OB′ ...(vertically opposite angles)

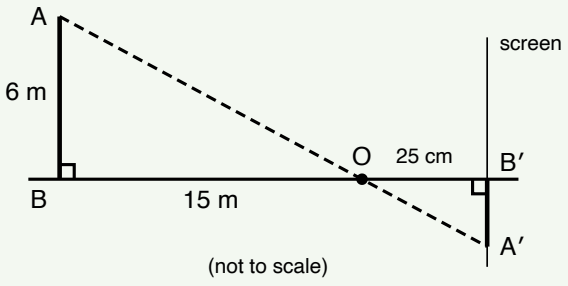
∴ △ABO ~ △A′B′O ...(AA test of similarity)

(c) ∴ AB/A′B′ = BO/B′O ...(corresponding sides of similar triangles are in proportion)

∴ 6/A′B′ = 15/0.25

∴ A′B′ = (6 × 0.25)/15 = 0.1 m

∴ Height of the image = 0.1 m = 10 cm.



Marking: (a) Correct figure – 1 mark · (b) △ABO ~ △A′B′O with AA test – 1 mark · (c) Height of image = 10 cm – 1 mark

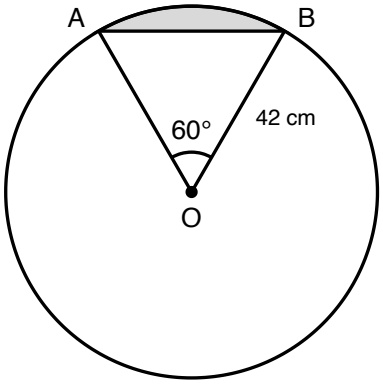
Examiner tip: Convert 25 cm to 0.25 m before forming the proportion (or convert 15 m to 1500 cm); mixed units give a wrong answer.

(ii) For a rangoli competition, a circular board of radius 42 cm is decorated. In the figure, O is the centre of the board and chord AB subtends $\angle AOB = 60°$ at the centre. The minor segment cut off by chord AB (shaded) is to be filled with coloured powder.

(a) Find the area of sector O-AB.

(b) Find the area of $\triangle OAB$.

(c) Find the area of the shaded segment. ($\pi = 22/7$, $\sqrt{3} = 1.73$)



Answer (3 marks)

$r = 42$ cm, $\theta = 60°$

(a) Area of sector O-AB $= (\theta/360) \times \pi r^2 = (60/360) \times (22/7) \times 42 \times 42 = (1/6) \times 5544 = 924$ cm^2

(b) In $\triangle OAB$, OA = OB (radii) and $\angle AOB = 60°$, so $\angle OAB = \angle OBA = 60°$. $\therefore \triangle OAB$ is equilateral with side 42 cm.

$A(\triangle OAB) = (\sqrt{3}/4) \times 42^2 = (1.73 \times 1764)/4 = 3051.72/4 = 762.93$ cm^2

(c) Area of segment = Area of sector − $A(\triangle OAB) = 924 - 762.93 = 161.07$ cm^2

$\therefore$ Area of the shaded segment = 161.07 cm^2.

Marking: (a) Area of sector 924 cm^2 – 1 mark · (b) $A(\triangle OAB) = 762.93$ cm^2 – 1 mark · (c) Area of segment = 161.07 cm^2 – 1 mark

Examiner tip: Show why $\triangle OAB$ is equilateral (radii equal and included angle 60°) before using $(\sqrt{3}/4)a^2$.

All the best for your exam!