4. TRIANGLES

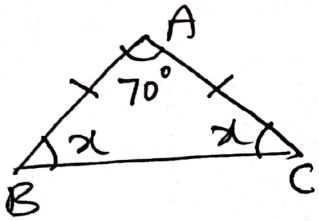
2025-26

Class: VIII. Mathematics

FOUNDATION; SOLUTIONS

TEACHING TASK
JEEMAINS LEVEL

01.

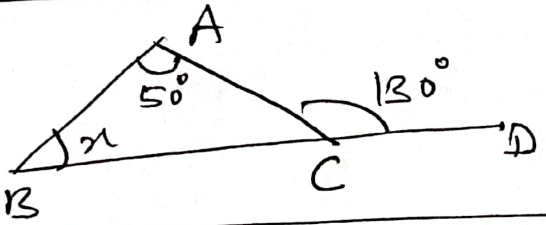


$\therefore x + x + 70^\circ = 180^\circ$

$\Rightarrow x = 55^\circ$

Ans: C

02



$x + 50^\circ = 130^\circ$

$\Rightarrow x = 80^\circ$

Ans: C

03

$60^\circ + 5x + 7x = 180^\circ \Rightarrow x = 10^\circ$

$\therefore 5x = 50^\circ, \quad 7x = 70^\circ$

Ans: A

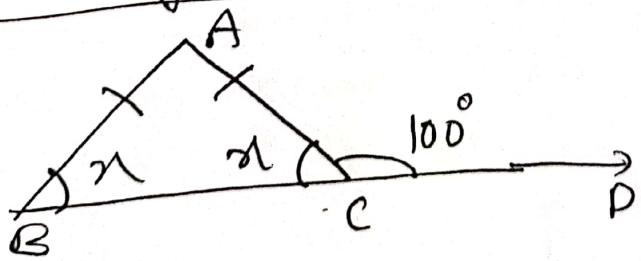
04 option: C. $1 : 3 : 6$

$\therefore x + 3x + 6x = 180^\circ \Rightarrow x = 18^\circ$

$\therefore$ Angles are $18^\circ, 54^\circ, 108^\circ$

Ans: C

05



$x = 80^\circ$

$\therefore x + x + A = 180^\circ$

$\Rightarrow 80^\circ + 80^\circ + A = 180^\circ$

$\Rightarrow A = 20^\circ$

Ans. A

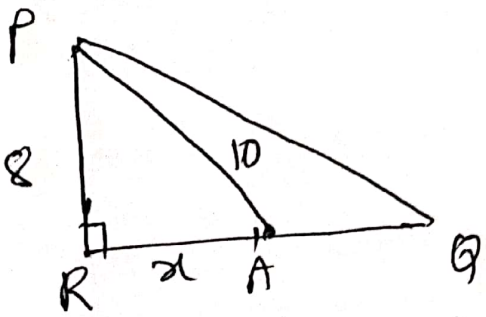
06 option B: 8cm, 9cm, 16cm

Since

$8 + 9 > 16$	$9 - 8 < 16$
$9 + 16 > 8$	$16 - 9 < 8$
$8 + 16 > 9$	$16 - 8 < 9$

Ans: B

07



$8^2 + x^2 = 10^2$

$\Rightarrow x = 6$

$\therefore RQ = 12\,cm$

$PQ^2 = PR^2 + QR^2$

$= 8^2 + 12^2 = 64 + 144 = 208$

Ans. B

08 $\angle B = 60°$, $\angle C = 45°$, $\therefore \angle A = 75°$

$\therefore$ Largest side = Side opp. to $\angle A = BC$

Ans. B

09 $\angle A = 50°$, $\angle B = 70°$, $\angle C = 60°$

Smallest side = Side opp. to $\angle A = BC$

Ans: B

10 $\angle B = 70°$, $\angle C = 50°$, $\therefore \angle A = 60°$

$\therefore x = 30°$

$x + y + 70° = 180°$

$\Rightarrow 30 + y + 70° = 180° \Rightarrow y = 80°$

we have. $y > B$ $(\because 70°)$

$\therefore AB > AD$

$y > x$

$AD > BD$

$\Rightarrow AD > CD$

Ans. D

JEE ADVANCED

01 A) Hypotenuse^2 = side^2 + side^2 (True)

B) side^2 = Hypotenuse^2 − side^2 (True)

Ans: A, B

02 $(a+b) + (b+c) + (c+a) = 11 + 13 + 12$

$\Rightarrow 2(a+b+c) = 36 \Rightarrow a+b+c = 18$

Ans: B, C

03 Statement I: $a=3cm$, $b=4cm$

$\therefore a^2+b^2=c^2 \Rightarrow c^2=9+16 \Rightarrow c=5$ (True)

Statement II: Conceptual (True)

Ans. A

04 Statement I: $a=13$, $b=84$ $c=85$

$a^2=169$, $b^2=7056$, $c^2=7225$

Clearly, $a^2+b^2=c^2$

$\Rightarrow$ Right angled triangle (True)

Statement II: Conceptual (True)

Ans. A

05 Assertion: Let $a=6$, $b=8$, $c=10$

$\Rightarrow a^2=36$, $b^2=64$, $c^2=100$

$\therefore a^2+b^2=c^2 \Rightarrow$ right angled $\triangle$le

Reason: Conceptual (True)

Ans. A

06 Assertion: Conceptual (False)

Reason: Conceptual (True)

Ans. D

07. From figure: $105^\circ+\angle ACD=180^\circ$ (linear pair)

$\Rightarrow \angle ACD=75^\circ$

Ans. A

08 In $\triangle CED$, $75^\circ+46^\circ+\angle CED=180^\circ$

$\Rightarrow \angle CED=59^\circ$

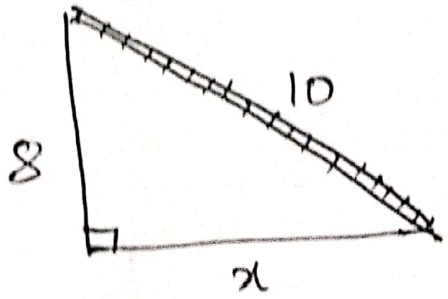
Ans. B

09 G $\rightarrow$ Centroid

Ans. C

10 Circumcentre $\rightarrow$ Equidistance from Vertices

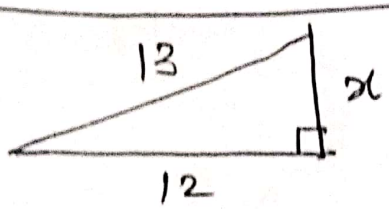
Ans. B

11. 

$x^2 + 8^2 = 10^2$ (4)

$\Rightarrow x = 6$

Ans: 6

12 

$x^2 + 12^2 = 13^2$

$\Rightarrow x = 5$

Ans: 5

13 a) $PQ + QR > PR$ b) $PQ - QR < PR$

c) $\angle P > \angle Q \Rightarrow QR > PR$ d) $\overline{PQ} > \overline{QR}$

$\Rightarrow \angle R > \angle P$

Ans: Q, S, R, P

14 a) Coincides also interior of the triangle

b) Collinear c) Inside the triangle

d) Exterior of the triangle Ans. (Q, R), S, T, P

LEARNERS TASK (CUQ's)

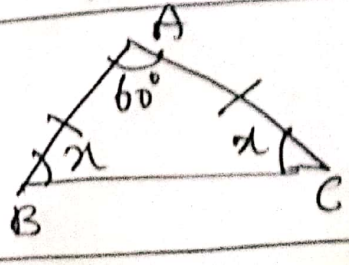
01. Conceptual Ans. B

02 Conceptual Ans. A

03 Conceptual Ans. B

04. Conceptual Ans. B

05 Conceptual Ans. D

06 

$x + x + 60^\circ = 180^\circ$

$\Rightarrow x = 60^\circ$

$\Rightarrow$ Equilateral $\triangle$

Ans: A

07 Conceptual — Ans. B

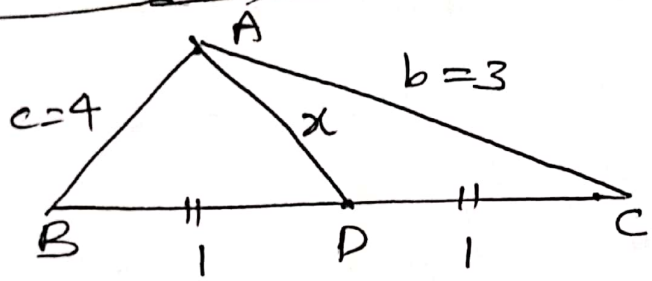
08 $AB = BC \Rightarrow \angle C = \angle B \Rightarrow \angle B - \angle C = 0^\circ$ — Ans. C

09. Conceptual — Ans. A

10 Conceptual — Ans. B

JEE MAINS

01.



$a = 2$

We have $AB^2 + AC^2 = 2(AD^2 + BD^2)$

$\Rightarrow 4^2 + 3^2 = 2(x^2 + 1^2)$

$\Rightarrow 16 + 9 = 2(x^2 + 1)$

$\Rightarrow x = \sqrt{\frac{23}{2}}$

Ans. A

02 $\angle A = \angle C \Rightarrow BC = AB$ — Ans. A

03 $A : B : C = 7 : 3 : 5$

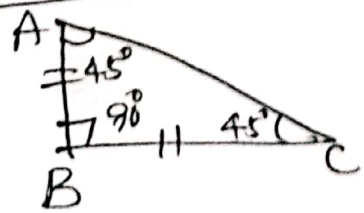
$\angle A = \frac{7}{15} \times 180^\circ = 7 \times 12 = 84^\circ$

Largest Angle = A

Largest side = BC

Ans. C

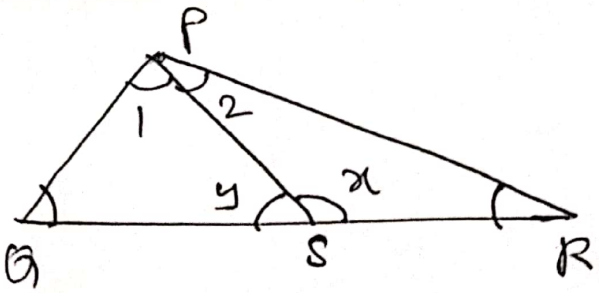
04.



$\angle B = 90^\circ$

Ans. C

05



Given $PR > PQ$

$\Rightarrow \angle Q > \angle R$

$\Rightarrow 180^\circ - (1+y) > 180^\circ - (2+x)$

$\Rightarrow -(1+y) > -(2+x)$

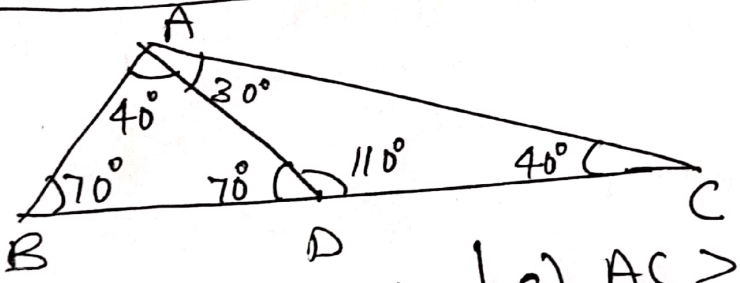
$\Rightarrow 1+y < 2+x$

$\Rightarrow y < x$ Since $\angle 1 = \angle 2$

$\Rightarrow x > y$

Ans: C

06



A) $AB > CD$ (True)

B) $AB = AC$ (False)

$\Rightarrow \angle C = \angle B$

$\Rightarrow 40^\circ = 70^\circ$ (False)

C) $AC > AB$

$\angle B > \angle C$

$\Rightarrow 70^\circ > 40^\circ$ (True)

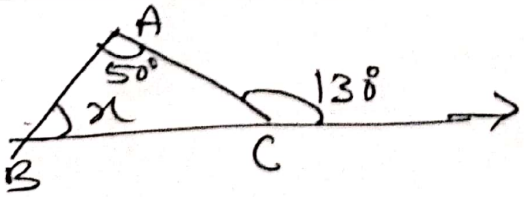
D) $AC = BC$

$\angle B = \angle A$

$\Rightarrow 70^\circ = 70^\circ$ (True)

Ans: B

07



$x + 50^\circ = 130^\circ \Rightarrow x = 80^\circ$

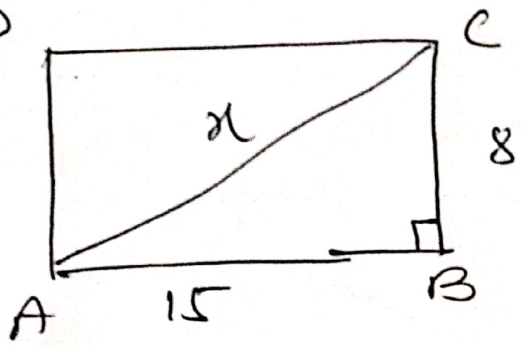
Ans: C

08

Given $\alpha = \beta + \gamma \Rightarrow \alpha + \alpha = \alpha + \beta + \gamma \Rightarrow 2\alpha = 180^\circ$

$\Rightarrow \alpha = 90^\circ$ ∴ Other two angles are $45^\circ, 45^\circ$ (OR) 30° or 60°

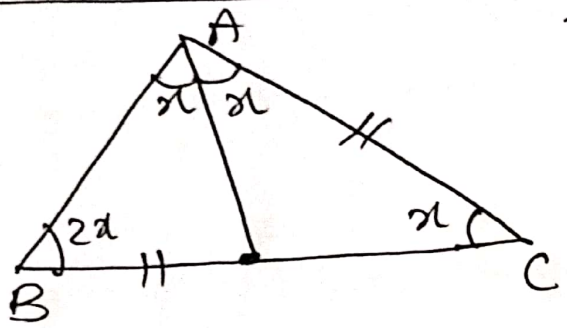
Ans: B, D

09. 

$\therefore x^2 = 15^2 + 8^2$ (7)

$\therefore x = 17$

Ans: C

10 

From the figure

$2x + 2x + x = 180^\circ$

$\Rightarrow x = 36^\circ$

$\therefore \angle BAC = 2x = 2 \times 36^\circ$

$= 72^\circ$ Ans. B

JEE ADVANCED LEVEL

01. Conceptual All options are tone Ans. A, B, C, D

02 A) $5^2, 12^2, 13^2 \Rightarrow 25, 144, 169$

$\therefore 5^2 + 12^2 = 13^2$ (True)

Similarly options B, C, D also satisfies the Pythagorus theorem Ans. A, B, C, D

03 Statement I: $30^\circ + 80^\circ + 40^\circ \neq 180^\circ$ (False)

Statement II: Conceptual (True) Ans: D

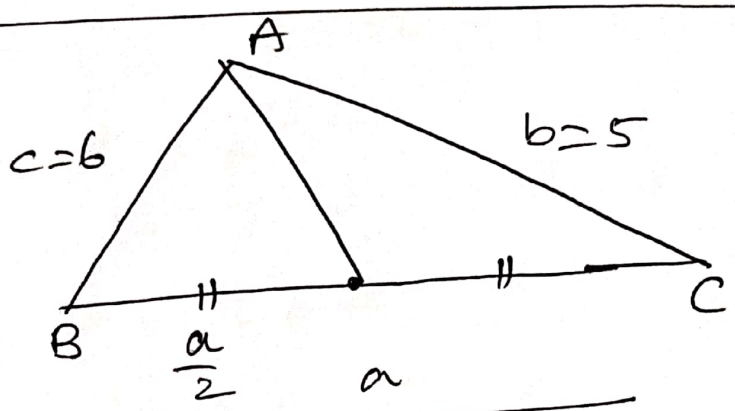
04 Statement I: Conceptual (True)

Statement II: Conceptual (True) Ans. A

05 Assertion: Conceptual (False)

Reason: Conceptual (True) Ans. D

06 Assertion: Conceptual (True)
Reason: Conceptual (True)
Ans. A

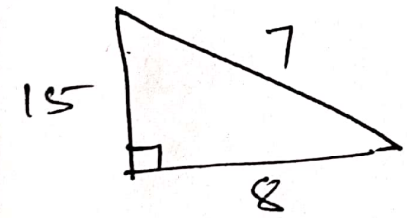
07


$$m_a = \frac{1}{2}\sqrt{2b^2+2c^2-a^2}$$

$$\Rightarrow 5 = \frac{1}{2}\sqrt{2\times25+2\times36-a^2}$$

$$\Rightarrow a = \sqrt{22}$$

Ans. B

08


Ans: 15
Ans. A

09 Conceptual
Ans: C

10 Conceptual
Ans. B

11 $PQ = 6\sqrt{3} \Rightarrow PQ^2 = 108$
$PR = 12 \Rightarrow PR^2 = 144$
$QR = 6 \Rightarrow QR^2 = 36$
Clearly, $PQ^2 + QR^2 = PR^2 \Rightarrow \angle Q = 90^\circ$
Ans. 90°

12 Largest angle $= \frac{4}{9}\times 180^\circ = 80^\circ$
Ans. 80°

13. a) $a = 10, \quad b = 24$

$a^2 = 100, \quad b^2 = 576$

$a^2 + b^2 = 676 = 26^2 = c^2 \Rightarrow c = 26$

b) $a^2 + b^2 = c^2$

$\Rightarrow 6^2 + b^2 = 10^2 \Rightarrow b = 8$

c) $a^2 + b^2 = c^2$

$\Rightarrow a^2 + 18^2 = 30^2 \Rightarrow a = 24$

d) $a^2 + b^2 = c^2$

$\Rightarrow 5^2 + 12^2 = c^2 \Rightarrow c = 13$

Ans. S, P, Q, R

14 a) 3, 4, 5 → Pythogorean triplet
Right-angled triangle

b) 6, 8, 10 → Right angled triangle
Pythogorean triplet

c) 5, 5, 5 → Equilateral triangle

d) 7, 10, 5 → Not a right angled $\triangle$le

~~Ans~~. (P, Q), (P, Q), R, S

⟹ THE END ∈