CAT

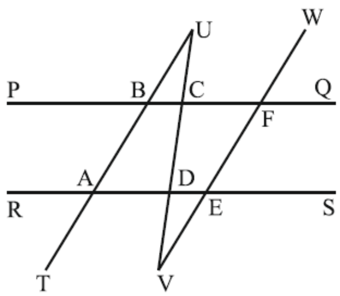
MBA PRO 2024

QUANTITATIVE APTITUDE

DPP: 01

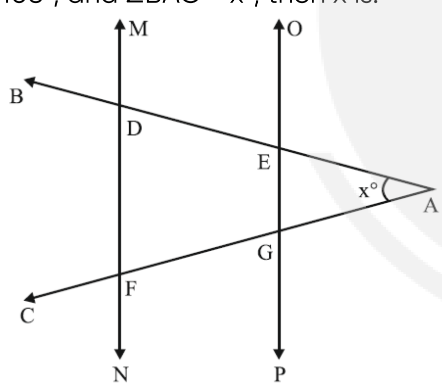
Lines & Angles & Triangles 1

Q1 In the given figure, PQ || RS and TU || VW. Also, ∠BUC = x°, ∠DVE = y°. Find the value of x° + y°, if ∠RAT = 65° and ∠ADC = 75°?



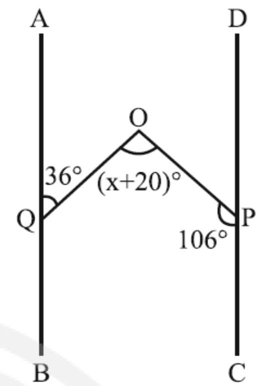
(A) 40° (B) 60°
(C) 80° (D) 100°

Q2 In the given figure, MN || OP, ∠BDF = 92º, ∠AGP = 108º, and ∠BAC = xº, then x is:



(A) 36° (B) 30°
(C) 25° (D) 20°

Q3 In the following figure, if AB II DC, then find the value of x°.

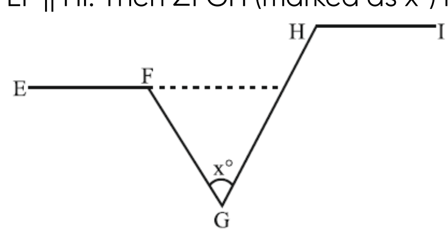


(A) 122° (B) 90°
(C) 110° (D) 120°

Q4 Two angles, x and y, on a straight line form a linear pair. What will the value of y in degrees be, if x − y = 70º?
(A) 65° (B) 55°
(C) 60° (D) 75°

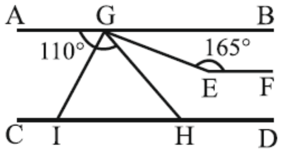
Q5 Two angles that are in the ratio 2 : 3 form a linear pair. What is the supplement of the first angle?
(A) 72° (B) 108°
(C) 90° (D) 60°

Q6 In the figure below, ∠EFG = 85°, ∠IHG = 105° and EF || HI. Then ∠FGH (marked as x°) is equal to:



(A) 10° (B) 15°
(C) 20° (D) 30°

Q7 In the given figure, AB || CD || EF. Find the value of ∠EGB + ∠HGI + ∠HIG.

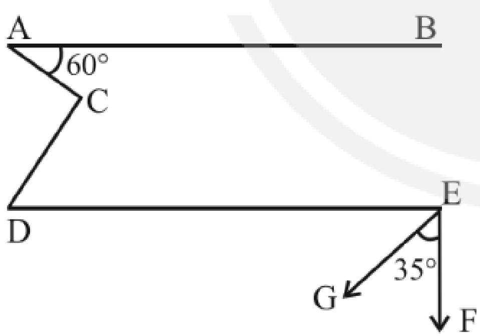


(A) 165° (B) 155°
(C) 125° (D) 135°

Q8 A ray OC bisects the line AB at 'O'. Find the angle between the angle bisectors of ∠AOC and ∠BOC?
(A) 30°
(B) 60°
(C) 90°
(D) Cannot be determined

Q9 If 5 times the complement of an angle is equal to 2 times its supplementary angle, what is 3 times its complementary angle?
(A) 90° (B) 180°
(C) 270° (D) 60°

Q10 In the below figure, AB || DE, CD || EG, and DE ⊥ EF. Find the measure of ∠ACD in degrees.



(A) 135° (B) 115°
(C) 110° (D) 120°

Q11 A garden in the shape of an equilateral triangle has a perimeter of 72 meters. What is the area of the garden?
(A) $72\sqrt{3}m^2$
(B) $108m^2$
(C) $156m^2$
(D) $144\sqrt{3}m^2$

Q12 Find the area of the triangle (in sq cm) whose sides are $6cm, 8cm$ and $12cm$.
(A) $\sqrt{391} sq \cdot cm$
(B) $\sqrt{455}$ sq.cm
(C) $\sqrt{434}$ sq.cm
(D) $\sqrt{463}$ sq.cm

Q13 If a, b and c are the sides of a triangle and $a^2 + b^2 + c^2 = bc + ca + ab$, then the triangle is:
(A) Equilateral (B) Isosceles
(C) Right-angled (D) Obtuse-angled

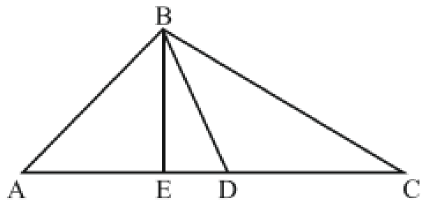
Q14 Find the sum of the perpendiculars drawn to the sides from a point P, which is inside an equilateral triangle with side $4\sqrt{3}$, to the sides of the triangle?
(A) 4 (B) 4.5
(C) 6 (D) 8

Q15 Find the area of an isosceles triangle whose sides are 8 cm, 8 cm and 12 cm.
(A) $6\sqrt{7}$ sq.cm
(B) $12\sqrt{7}$ sq.cm
(C) $14\sqrt{7}$ sq.cm
(D) 14 sq. cm

Q16 In $\triangle XYZ, \angle Z$ is a right angle and W is a point on YZ such that $ZW = WY$. If $XY = 9\sqrt{2}cm$ and $XZ = 5\sqrt{2}cm$, then find the length of XW (in cm)?
(A) $2\sqrt{13}$
(B) $\sqrt{78}$
(C) $5\sqrt{3}$
(D) $3\sqrt{6}$

Q17

In the following figure, BD is median, and BE is perpendicular to AC. $\angle ABC$ is a right angle. $AB = 4cm, BC = 3cm$. The length of DE lies between:

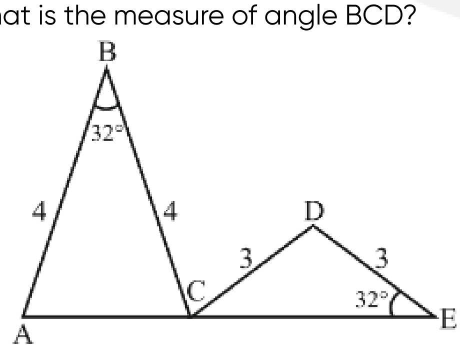


(A) 0 and 0.5 (B) 0.5 and 1
(C) 1 and 1.5 (D) 1.5 and 2

Q18 In a right-angled triangle ABC, the length of the shortest median is $14.5cm$ and one of its sides are $21cm$. Find the length of the longest median to the triangle.
(A) $\sqrt{451}cm$
(B) $\sqrt{541}cm$
(C) $\sqrt{553}cm$
(D) $\sqrt{571}cm$

Q19 ABC is a right-angle triangle which is right angled at $B. BD$ is perpendicular to AC. If $AD = 9cm$ and $DC = 4cm$, find the ratio of $AB : BC$.
(A) $2 : 3$ (B) $3 : 1$
(C) $3 : 2$ (D) $4 : 3$

Q20 Using the information given in the diagram, what is the measure of angle BCD?



(A) $37°$ (B) $69°$
(C) $74°$ (D) $89°$

Q21 In triangle XYZ, the altitude from vertex X to side YZ has length 12, and the length of side YZ is 20. What is the area of triangle XYZ?
(A) 60 square units
(B) 120 square units
(C) 144 square units
(D) 240 square units

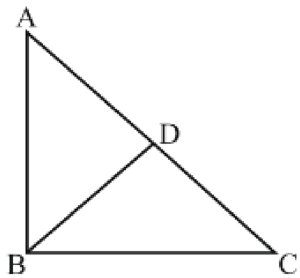
Q22 In the triangle ABC, AB = 35, BC = 24 and AC = 53, Find the length of the altitude BE on the side AC.
(A) 24
(B) 28
(C) 36
(D) None of the above

Q23 In a triangle $ABC, \angle A = 90°, AB = 10cm$, and $AC = 24cm$. If AD is perpendicular to BC, the length of AD in cm is..............
(A) $\frac{120}{13}$
(B) $\frac{60}{13}$
(C) $\frac{130}{13}$
(D) $\frac{180}{13}$

Q24 In triangle ABC, AD is the altitude from vertex A to side BC, and $AB = 12, AC = 16$, and $BC = 20$. What is the length of AD ?
(A) 6 (B) 8
(C) 9.6 (D) 12.4

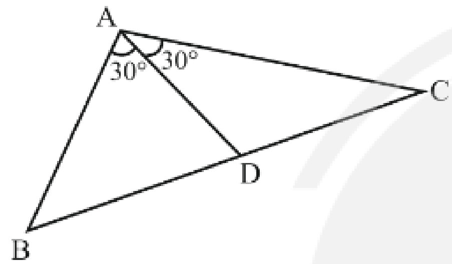
Q25 In a triangle ABC, AD, BE and CF are the medians. Find $AD^2 + BE^2 + CF^2$ if it is given that $AB = 6, BC = 12$ and $AC = 8$.
(A) 162 (B) 183
(C) 173 (D) 195

Q26 In ΔABC, ∠B is a right angle, AC = 6 cm, and D is the mid point of AC, the length of BD is:



(A) (a) $4cm$
(B) $\sqrt{6}cm$
(C) $3cm$
(D) $3.5cm$

Q27 ABC is a triangle with $AB = 12$ and $AC = 6$. If $\angle BAD = \angle CAD = 30^\circ$, find AD.



(A) $5\sqrt{3}$
(B) $3\sqrt{3}$
(C) $4\sqrt{3}$
(D) $2\sqrt{3}$

Q28 a, b, c are integers that are sides of an obtuse-angled triangle. If $ab = 9$, how many distinct values of c are possible?

(A) 1
(B) 2
(C) 3
(D) More than 3

Q29 In an isosceles triangle ABC, with AB = AC, the altitude from vertex A intersects BC at point D. Which of the following statements is necessarily true?

(A) BD = DC
(B) AD = BD
(C) AD = DC
(D) AB = AD

Q30 Consider obtuse-angled triangles with sides 7 cm,13 cm and x cm. If x is an integer then how many values of x are possible.

(A) 1
(B) 9
(C) 3
(D) 4

Answer Key

Q1	(C)
Q2	(D)
Q3	(B)
Q4	(B)
Q5	(B)
Q6	(A)
Q7	(C)
Q8	(C)
Q9	(B)
Q10	(B)
Q11	(D)
Q12	(B)
Q13	(A)
Q14	(C)
Q15	(B)
Q16	(B)
Q17	(B)
Q18	(B)
Q19	(C)
Q20	(C)
Q21	(B)
Q22	(D)
Q23	(A)
Q24	(C)
Q25	(B)
Q26	(C)
Q27	(C)
Q28	(A)
Q29	(A)
Q30	(B)

Hints & Solutions

Q1 Text Solution:

Topic - Lines and Angles

TU || VW, ∠BUC and ∠DVE form alternate angles and they are equal.

That is, x° = y°

Also, using transversal line properties ∠RAT = ∠BAD = ∠UBC = 65°

Similarly, ∠ADC = 75° = ∠BCU

So, ∠UBC + ∠BCU + ∠BUC = 180°

65° + 75° + x° = 180°

x° = 40°

So, x° + y° = 2 × 40° = 80°

Hence, option c is correct.

Q2 Text Solution:

Topic - Lines and Angles

MN || OP

∠ BDF = ∠BEP = 92° (Corresponding angles)

Also, ∠AEG = 180 - 92 = 88° (Linear pair)

Similarly, ∠AGE = 180 – ∠AGP = 180 – 108 = 72°

In triangle AEG, x = 180 - 88 - 72 = 20° (The sum of angles of a triangle is 180°)

Hence, option d is correct.

Q3 Text Solution:

Topic - Lines and Angles

As CD is a straight line, 106° + ∠DPO = 180°

∠DPO = 74°

Draw EF || DC at O.

As per alternate angles, ∠DPO = ∠POF = 74°

∠AQO = ∠QOF = 36°

x° + 20° = 74° + 36°

x° = 90°

Hence, option b is correct.

Q4 Text Solution:

Topic - Lines and Angles

Since x and y form a linear pair (sum of two adjacent angles on a straight line is 180°)

so, x + y = 180° ....eq(1)

Given: x – y =70° ..... eq(2)

Solving the above two equations, we get y = 55°.

Hence, option b is correct.

Q5 Text Solution:

Topic - Lines and Angles

Let the two angles be 2x and 3x.

Since they form a linear pair, 2x + 3x = 180°

x = 36°

So, the first angle is 72°; the second angle is 108°

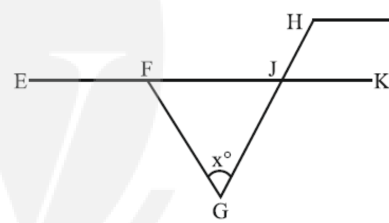
Supplement of 72° is (180 – 72) = 108°.

Hence, option b is correct.

Q6 Text Solution:

Topic - Lines and Angles

Extend EF to K such that it cuts GH at J.



∠EFG + ∠GFK = 180°(Linear pair)

85°+ ∠GFK = 180° or

∠GFK = 95°

∠IHG + ∠KJH = 180°(Sum of interior angles on the side of the transversal is 180°)

or, 105°+ ∠KJH = 180°

∠KJH = 75°

Also, ∠KJH = ∠FJG = 75°(Vertically opposite angles)

Now, in triangle FJG, ∠FJG + ∠JGF + ∠GFJ = 180°

(Sum of interior angles of the triangle)

75 + x + 95 = 180 or x = 10°.

Hence, option a is correct.

Q7 Text Solution:

Topic - Lines and Angles

As ∠FEG = 165°, ∠EGB = 180° - 165° = 15°

∠HGB = 180° - 110° = 70°

As ∠HGB and ∠IHG are alternate angle, ∠IHG = 70°

Then, ∠HGI + ∠HIG = 180° - 70° = 110°

∠EGB + ∠HGI + ∠HIG = 15° + 110° = 125°

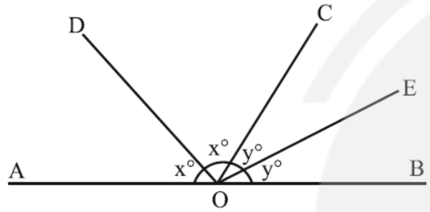
Hence, option c is correct.

Q8 Text Solution:

Topic - Lines and Angles

Let the angles ∠AOC and ∠BOC be 2x° and 2y° respectively.

Also, let OD and OE be the angle bisectors of ∠AOC and ∠BOC respectively.



As AOB is a straight line, 2x° + 2y° = 180°

x°+y°= $\frac{180^\circ}{2} = 90^\circ$

Here, ∠DOE = x° + y° = 90°

Hence, option c is correct.

Q9 Text Solution:

Topic - Lines and Angles

Let x° be the original angle.

Its complementary angle = 90° - x° and supplementary angle = 180° - x°

It is given that 5 × (90°- x°) = 2 × (180° - x°)

450° - 5x° = 360° - 2x°

90° = 3x°

x° = 30°

Complementary angle = 90° - 30° = 60°

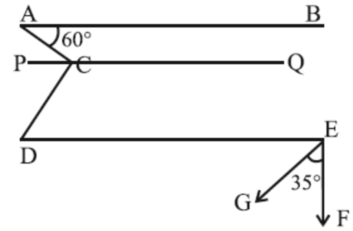
Hence, 3 × 60° = 180°

Hence, option b is correct.

Q10 Text Solution:

Topic - Lines and Angles

Draw a line PQ which is parallel to AB and DE, passes through C.



As AB || DE || PQ, so ∠BAC = ∠PCA = 60° (alternate interior angles)

Also, DE ⊥ EF and ∠GEF = 35°

So, ∠DEG = 90° – 35° = 55°

As CD || EG, ∠DEG = ∠CDE = 55°

As PQ || DE then ∠PCD = ∠CDE = 55°

Now, ∠ACD = ∠PCA + ∠PCD = 60 + 55 = 115°

Hence, option b is correct.

Q11 Text Solution:

Topic - Triangles

Since the triangle is equilateral, all sides are equal.

Perimeter of the triangle $= 72$ meters

Since there are three sides, each side is:

$$s = \frac{72}{3} = 24 \text{ meters}$$

Now, using the formula for the area of an equilateral triangle:

Area $= \frac{\sqrt{3}}{4} \times s^2$, where s is the length of each side

Area $= \frac{\sqrt{3}}{4} \times (24 \text{ meters })^2$

Area $= \frac{\sqrt{3}}{4} \times 576m^2$

Area $= 144\sqrt{3}m^2$

Hence, option d is correct.

Q12 Text Solution:

Topic - Triangles

To find the area of a triangle, when all the sides are given, we can use Heron's formula, i.e.,

$\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c are the sides of the triangle and s is the semi perimeter $= \frac{(a+b+c)}{2}$.

So, here, $s = \frac{(6+8+12)}{2} = 13cm$

Area of the triangle,

$$A = \sqrt{13(13-6)(13-8)(13-12)}$$
$$= \sqrt{455} \text{ sq.cm}$$

Hence, option b is correct.

Q13 Text Solution:

Topic - Triangles

According to the question, we can write the following

$$a^2 + b^2 + c^2 - bc - ca - ab = 0$$
$$2a^2 + 2b^2 + 2c^2 - 2bc - 2ca - 2ab = 0$$
$$a^2 + b^2 - 2ab + b^2 + c^2 - 2bc + c^2 + a^2 - 2ac = 0$$
$$(a-b)^2 + (b-c)^2 + (c-a)^2 = 0$$

$$\text{It is only possible when, } (a-b)^2 = 0, \ (b-c)^2 = 0 \text{ and } (c-a)^2 = 0$$

Then we get $a = b = c$.

All the sides of the triangle are equal and it is only possible when the triangle is an equilateral triangle. Hence, option a is correct.

Q14 Text Solution:

Topic - Triangles

Let ABC be an equilateral triangle.

Let a, b, and c be the length of the perpendiculars drawn to AB, BC, and CA, respectively, from the point P, which is inside the triangle.

Area of triangle ABC

$$= \frac{1}{2} \times a \times AB + \frac{1}{2} \times b \times BC + \frac{1}{2} \times c \times AC$$

Here, $AB = BC = AC = 4\sqrt{3}$

Also, area of triangle $ABC = \left(\frac{\sqrt{3}}{4}\right) \times (4\sqrt{3})^2$

$$\left(\frac{\sqrt{3}}{4}\right) \times (4\sqrt{3})^2 = \frac{1}{2} \times (a+b+c) \times 4\sqrt{3} \text{ or}$$

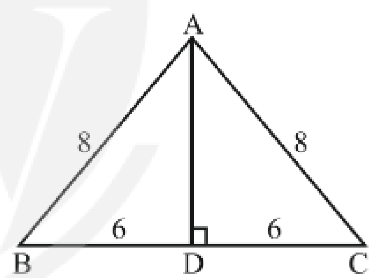
$\left(\frac{\sqrt{3}}{2}\right) \times 4\sqrt{3} = (a+b+c)$ or $a+b+c=6$

Hence, option c is correct.

Q15 Text Solution:

Topic - Triangles

Consider a triangle ABC, where AB = AC = 8 cm and BC = 12 cm



Drop a perpendicular AD from A on BC.

As per the property of an isosceles triangle, it will also act as a median, if the perpendicular is dropped from the vertex that contains the two equal sides.

$So, BD = DC = 6cm$

In the right-angled triangle ADB, applying Pythagoras theorem, we get the following:

$$8^2 = 6^2 + AD^2$$
$$\Rightarrow AD = 2\sqrt{7}cm$$

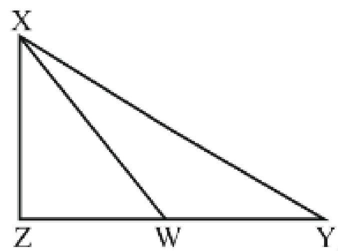
Thus, area of triangle ABC

$$= \frac{1}{2} \times BC \times AD = \frac{1}{2} \times 12 \times 2\sqrt{7}$$
$$= 12\sqrt{7} sq.cm$$

Hence, option b is correct.

Q16 Text Solution:

Topic - Triangles



In $\triangle XYZ$

$XY^2 = XZ^2 + ZY^2$

$162 = 50 + ZY^2$

$ZY^2 = 112$

$ZY = 4\sqrt{7}cm$

Since ZW = WY

Therefore $ZW = 2\sqrt{7}cm$

In $\triangle XZW$,

$$XW^2 = XZ^2 + ZW^2$$
$$XW^2 = 50 + 28$$
$$XW = \sqrt{78}cm$$

Hence, option b is correct.

Q17 Text Solution:

Topic - Triangles

Given $AB = 4cm$, and $BC = 3cm$

By the Pythagoras theorem,

$$AC^2 = AB^2 + BC^2$$
$$AC^2 = 16 + 9$$
$$AC = \sqrt{25}$$
$$AC = 5cm$$

We know that, the length of the median from the right angle vertex in a right angled triangle is half of the length of the hypotenuse. This is known as the median of a right triangle from the right angle vertex.

So,

$$BD = \frac{AC}{2} = \frac{5}{2}cm$$
$$\text{And } BE = \frac{AB \times BC}{AC} = \frac{12}{5}cm.$$

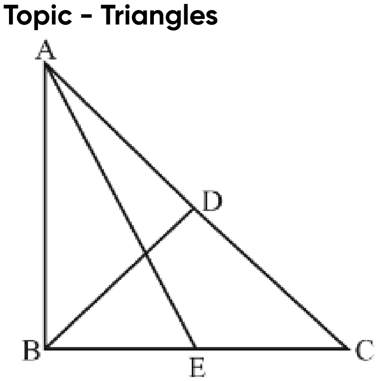
In $\triangle BED$,

$$BD^2 = BE^2 + ED^2$$
$$\frac{25}{4} = \frac{144}{25} + ED^2$$
$$ED^2 = \frac{25}{4} - \frac{144}{25}$$
$$ED^2 = \frac{625 - 576}{100}$$
$$ED = \frac{\sqrt{49}}{\sqrt{100}} = \frac{7}{10} = 0.7cm$$
$$ED = 0.7cm$$

Hence, option b is correct.

Q18 Text Solution:

Topic - Triangles



The shortest median will be on the longest side and the longest median is on the shortest side.

Consider a right-angled triangle ABC which is right angled at B.
Let $AB = 21cm$.
BD is the shortest median on AC.
We know that the midpoint of the hypotenuse is equidistant from all the vertices.
Thus, $AD = DC = BD = 14.5cm$
Thus, $AC = 29cm$
By the Pythagoras theorem, in the right-angled triangle ABC, we get

$$AC^2 = AB^2 + BC^2$$
$$29^2 = 21^2 + BC^2$$
$$\text{Or } BC = 20cm$$

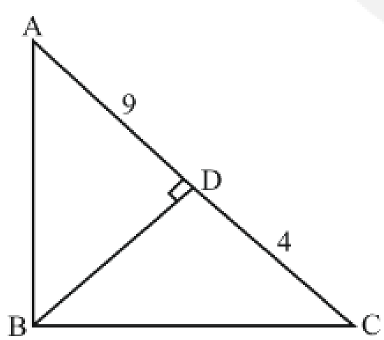
The longest median will be on BC, i.e., AE.
Applying Pythagoras theorem in the right-angled triangle ABE,

$$AE^2 = AB^2 + BE^2$$
$$AE^2 = 21^2 + 10^2$$
$$AE = \sqrt{541}cm.$$

Hence, option b is correct.

Q19 Text Solution:

Topic - Triangles



Let $AB = xcm, BC = ycm$, and $BD = zcm$.
In a right-angle triangle ABC, as per the Pythagoras theorem,

$$x^2 + y^2 = 169$$

Also, as per the Pythagoras theorem in right-angled triangles ABD and BDC,

$$x^2 = 9^2 + z^2$$

and $y^2 = 4^2 + z^2$
Substituting the above two equations in eq(1), we get

$$9^2 + z^2 + 4^2 + z^2 = 169 \text{ or } z = 6cm$$

From eq(2),
$x = \sqrt{117}$ and $y = \sqrt{52}$ thus
$x : y = \sqrt{\left(\frac{117}{52}\right)} = 3 : 2$
Hence, option c is correct.

Q20 Text Solution:

Topic - Triangles

Both triangle ABC and CDE are isosceles.
Base $\angle BAC$ and $\angle BCA$ are equal. They are both equal to 74°
$\angle DEC$ and $\angle DCE$ are equal to 32° angle $BCD = (180 - (74 + 32)) = 74^\circ$
Hence, option c is correct.

Q21 Text Solution:

Topic - Triangles

The area of a triangle can be calculated using the formula $A = \frac{1}{2} \times b \times h$, where b is the length of the base and h is the length of the altitude from the opposite vertex to that base.
In triangle XYZ, the altitude from vertex X to side YZ has length 12, which is the value of h.
The length of the base YZ is 20 , which is the value of b. Therefore, the area of triangle XYZ is:

$$A = \frac{1}{2} \times b \times h$$
$$A = 120$$

Therefore, the area of triangle XYZ is 120 square units, which corresponds to option B.

Q22 Text Solution:

Topic - Triangles

Let us, first, find the area of the triangle by Heron's formula.

Semi- perimeter, $s = \frac{35+24+53}{2} = 56$

Area $= \sqrt{[s(s-a)(s-b)(s-c)]}$, where a, b, and c are the sides of the triangle.

$$= \sqrt{[56(56-35)(56-24)(56-53)]}$$
$$= \sqrt{[56(21)(32)(3)]}$$
$$= 336 \text{ sq units} \quad .....eq(1)$$

Let the altitude $BE = y$ units.

Also, area of triangle can be calculated as $\left(\frac{1}{2}\right) \times$ base $\times$ altitude to the opposite vertex.

$$= \left(\frac{1}{2}\right) \times (53) \times y$$

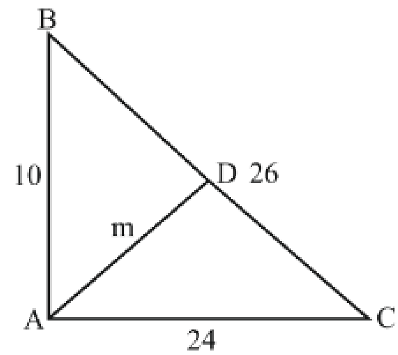
From, eq(1) and (2)

$$336 = \left(\frac{1}{2}\right) \times 53 \times y$$
$$y = 12.67 \text{ units}$$

Hence, option d is correct.

Q23 Text Solution:

Topic - Triangles



Let the length of $AD = mcm$

Applying Pythagoras theorem, in the above triangle, we get $BC = 26cm$.

Area of triangle $ABC = \left(\frac{1}{2} \times AB \times AC\right)$

$$= \left(\frac{1}{2} \times 10 \times 24\right)$$
$$= 120sqcm$$

Also, the area of triangle can be given by

$$\left(\frac{1}{2} \times BC \times AD\right)$$
$$= \left(\frac{1}{2} \times 26 \times m\right) = 13m$$

Equating the above equations, we get

$m = \frac{120}{13}$ Hence, option a is correct.

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The area of a triangle can be calculated using the formula $A = \frac{1}{2} \times$ base $\times$ height, where the base is any side of the triangle, and the height is the length of the altitude from the opposite vertex to that side. In this case, the area of triangle ABC can be calculated as follows:

$$A = \frac{1}{2} \times BC \times AD$$

$$A = \frac{1}{2} \times 20 \times AD$$
$$A = 10 \times AD$$

We can also calculate the area of triangle ABC using Heron's formula, which states that the area of a triangle with sides a, b, and c is given by:

$$A = \sqrt{(s(s-a)(s-b)(s-c))}$$

where s is the semi-perimeter of the triangle, defined as:

$$s = \frac{a+b+c}{2}$$

In this case, the semi-perimeter of triangle ABC is:

$$s = \frac{AB + AC + BC}{2}$$

$$s = \frac{12+16+20}{2}$$
$$s = 24$$

Using Heron's formula, we can calculate the area of triangle ABC as:

$$A = \sqrt{(24(24-12)(24-16)(24-20))}$$
$$A = \sqrt{(24 \times 12 \times 8 \times 4)}$$
$$A = \sqrt{(9216)}$$
$$A = 96$$

Since we have two expressions for the area of triangle ABC, we can equate them and solve for AD:

$$10 \times AD = 96$$
$$AD = 9.6$$

Hence option c.

Q25 Text Solution:

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We know that in a triangle, sum of the square of the medians $= \left(\frac{3}{4}\right)$ (sum of the squares of the sides) Sum of the squares of the medians

$$= \left(\frac{3}{4}\right)(6^2 + 12^2 + 8^2)$$
$$= \left(\frac{3}{4}\right)(244)$$
$$= 183$$

Hence, option b is correct.

Q26 Text Solution:

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For any right-angled triangle, the length of the median to hypotenuse is equal to half the length of hypotenuse.

So, $BD = \frac{1}{2} \times AC = \frac{1}{2} \times 6 = 3cm$

Hence, option c is correct.

Q27 Text Solution:

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We know that if two sides of the triangle and the included angle is given, the area of the triangle is given by the following equation:

Area of triangle $= \frac{1}{2} \times$ products of the sides $\times \sin$ of the angle between them

Now, area of triangle $ABC =$ Area of triangle ABD + Area of triangle ADC

$$\frac{1}{2} \times AB \times AC \times \sin 60^{\circ} = \frac{1}{2} \times AB \times AD \times \sin 30^{\circ} + \frac{1}{2} \times AC \times AD \times \sin 30^{\circ}$$

$$12 \times 6 \times \frac{\sqrt{3}}{2} = 12 \times AD \times \frac{1}{2} + 6 \times AD \times \frac{1}{2}$$

$$36\sqrt{3} = 9AD \Rightarrow AD = 4\sqrt{3}$$

Hence, option c is correct.

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Now, $ab = 9$.

There are only two possible pairs of (a, b) that satisfy the given conditions: $(1, 9)$ and $(3, 3)$.

Case 1: $(1, 9)$

We know that if two sides of a triangle are given, then the third side lies between the difference and the sum of the two given sides.

Clearly, c lies between 8 and 10, i.e., 9 .

Now, for the triangle to be obtuse, there must be one pair of sides, whose sum of squares is less than the square of the third side.

No possibility.

Case 2: $(3, 3)$

We know that if two sides of a triangle are given, then the third side lies between the difference and the sum of the two given sides.

Clearly, c lies between 0 and 6 .

Thus, there are five possibilities from 1 to 5 .

Now, for the triangle to be obtuse, there must be one pair of sides, whose sum of squares is less than the square of the third side.

(i) if the third side is 1 :

Squares of three sides will be 9,9 , and 1 .

Not possible, as it does not satisfy the condition for the triangle to be obtuse.

(ii) if the third side is 2 :

Squares of three sides will be 9,9 , and 4 .

Not possible, as it does not satisfy the condition for the triangle to be obtuse.

(ii) if the third side is 3 :

Squares on three sides will be 9, 9, and 9 .

Not possible, as it does not satisfy the condition for the triangle to be obtuse.

(iv) if the third side is 4:

Squares on three sides will be 9,9, and 16 .

Not possible, as it does not satisfy the condition for the triangle to be obtuse.

(v) if the third side is 5 :

Squares on three sides will be 9, 9, and 25 .

The triangle is obtuse, as $9 + 9 < 25$.

Thus, only one possible value of c.

Hence, option a is correct.

Q29 Text Solution:

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Since the triangle is isosceles with $AB = AC$, we know that the altitude from vertex A also bisects BC, and that $BD = DC$. This means that option A) is true.

Option B) is not true since AD is the altitude from vertex A, and it is not necessarily equal to BD.

Option C) is not true since the altitude AD and the bisector of BC, which passes through D, are not necessarily the same length.

Option D) is not true since AD is the altitude from vertex A, and it is not necessarily equal to AB.

Therefore, the correct answer is option (a) BD = DC.

Q30 Text Solution:

Topic - Triangles

For obtuse angles triangle $c^2 > a^2 + b^2$ If $x =$ greater side then

$$
\begin{aligned}
x^2 &> 7^2 + 13^2 \\
x^2 &> 218 \\
x &> 14.76 \ldots\ldots
\end{aligned}
$$

(1)

If 13 is the greater side then

$$
\begin{aligned}
13^2 &> 7^2 + x^2 \\
x &< 10.95 \ldots
\end{aligned}
$$

(2)

We know that the third side will lie between the sum and difference of other two sides.

$$
\begin{aligned}
&(13 - 7) < x < (7 + 13) \\
&6 < x < 20 \ldots\ldots\ldots (3)
\end{aligned}
$$

From this the values can be $(7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19)$.

By using (1), (2) and (3) we get,

Possible values of $x = 7, 8, 9, 10, 15, 16, 17, 18, 19 = 9$ values