Note:-
    1. All Questions are compulsory.
    2. Numbers on the right indicate full marks.

Q.1   In $\triangle$ABC, AB = $6\sqrt{3}$ cm, AC = 12 cm, BC = 6 cm. Find measure of $\angle$A. **(1)**

    A) 30°   B) 60°

    C) 90°   D) 45°

    Ans : A

Q.2   Height and base of a right angled triangle are 24 cm and 18 cm find the length of its hypotenuse. **(1)**

    A) 24 cm   B) 30 cm

    C) 15 cm   D) 18 cm

    Ans : B

Q.3   Altitude on the hypotenuse of a right angled triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of the altitude. **(1)**

    A) 9 cm   B) 4 cm

    C) 6 cm   D) $2\sqrt{6}$ cm

    Ans : C

Q.4   Find perimeter of a square, if its diagonal is $10\sqrt{2}$ cm. **(1)**

    A) 10 cm   B) $40\sqrt{2}$ cm

    C) 20 cm   D) 40 cm

    Ans : D

Q.5   If *a, b, c* are sides of a triangle and $a^2 + b^2 = c^2$, name the type of triangle. **(1)**

    A) Obtuse angled triangle   B) Acute angled triangle

    C) Right angled triangle   D) Equilateral triangle

    Ans : C

Q.6   Out of the dates given below which date constitutes a Pythagorean triplet ? **(1)**

    A) 15/08/17   B) 16/08/16

    C) 3/5/17   D) 4/9/15

    Ans : A

Q.7   In a right angled triangle, if sum of the squares of the sides making right angle is 169 then what is the length of the hypotenuse? **(1)**

    A) 15   B) 13
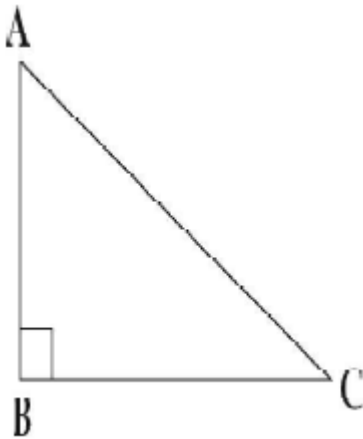
    C) 5   D) 12

    Ans : B

Q.8 Out of the following, which is the Pythagorean triplet? **(1)**

A) (1, 5, 10)   B) (3, 4, 5)

C) (2, 2, 2)   D) (5, 5, 2)

Ans : B

Q.9 The hypotenuse of right angled triangle with perpendicular sides 4 and 5 is _____. **(1)**

A) 41   B) $\sqrt{41}$

C) 6   D) None of the above

$\triangle$ABC is right angle triangle
According ro Pythagoras Theorem

$AC^2 = AB^2 + BC^2$

$= 4^2 + 5^2$

$= 16 + 25$

$= 41$

$= \sqrt{41}$

Ans : B

Q.10 In $\triangle PQR, \angle P = 90^\circ, PS \perp QR$, then $PS^2 =$ _____. **(1)**

A) $PQ^2 + PR^2$ B) $QS^2 + RS^2$

C) $QS \times SR$ D) $QS + SR$

$\triangle$ PQR, $\angle$P = 90°, PS $\perp$ QR
PS is the Geometric mean of QS and SR

$\therefore$ PS^2 = QS x SR

By using Geometric mean theorem

Ans : C

Q.11 In $\triangle ABC$, AD is median drawn to side BC, then which of the following statements are true? **(1)**

(i) $AB^2 + AC^2 = 2AD^2 + 2BC^2$

(ii) $AB^2 + AC^2 + BC^2 = 2AD^2 + 2BD^2$

(iii) $AB^2 + AC^2 = 2AD^2 + 2BD^2$

(iv) $AB^2 + AC^2 = 2DC^2 + 2AD^2$

A) Only (iii)   B) (i), (iii) & (iv)

C) Only (iv)   D) (iii) & (iv)

By using Pythagoras Theorem

Ans : D

Q.12 The diagonal of a square is $9\sqrt{2}$ cm, then its area is _____. **(1)**

A) 162 cm^2 B) 18 cm^2

C) 81 cm^2 D) Data is insufficient

Diagonal of a square = $9\sqrt{2}$ cm

$$\text{Area of square} = \frac{1}{2} \times (\text{Diagonal})^2$$
$$= \frac{1}{2} \times \left(9\sqrt{2}\right)^2$$
$$= \frac{1}{2} \times \times 81 \times 2$$
$$= 81 \, \text{cm}$$

Ans : C

Q.13 $\triangle ABC$ is right angled triangle. $\triangle ABR$, $\triangle BCP$, $\triangle ACQ$ are equilateral triangle. Then **(1)**

A) $A(\triangle ABR) + A(\triangle BCP) = A(\triangle ACQ)$ B) $P(\triangle ABR) + P(\triangle BCP) = A(\triangle ACQ)$

C) $[A(\triangle ABR)]^2 + [A(\triangle BCP)]^2 = [A(\triangle ACQ)]^2$ D) None of the above.
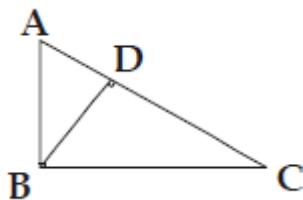
Ans : A

Q.14 In $\triangle ABC$, $m\angle B = 90°$, if AB = 10, BC = 24, then the length of median drawn from point B **(1)**
to side AC is the hypotenuse is _____.

A) 20   B) 12

C) 13   D) Data is sufficient

According to Pythagoras Theorem

AC^2 = AB^2 + BC^2

   = 100 + 576

   = 676

   = 26

D is the midpoint on side AC. BD is the median

$$BD = \frac{1}{2}AC$$
$$= \frac{1}{2} \times 26$$
$$= 13 \, \text{unit}$$

Ans : C

Q.15 In $\triangle ABC$, a = 5, b = 12, c = 13, the hypotenuse is _____. **(1)**

A) AB   B) BC

C) AC   D) Cannot be determined

a = 5, b = 12, c = 13

a^2 = 25, b^2 = 144, c^2 = 169

∴ $c^2 = b^2 + a^2$
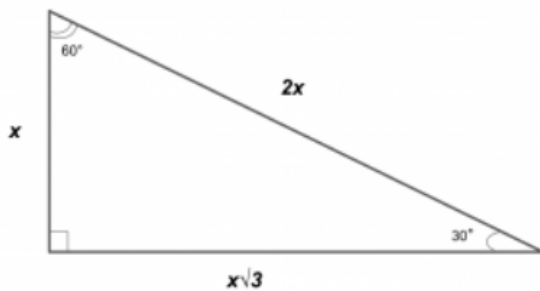
     = 144 + 25

     = 169

∴ AC is the hypotenuse.

Ans : C

Q.16 In a 30° - 60° - 90° triangle, side opposite to 30° angle is x units, then its area is _____. **(1)**

A) $\frac{\sqrt{3}}{2}x$ B) $\sqrt{2}\,x^2$

C) $\frac{x^2}{2}$ D) $\frac{\sqrt{3}}{2}\,x^2$

Side opposite to 30° is x

$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times \sqrt{3}x \times x$$

$$= \frac{\sqrt{3}}{2}x^2$$

Ans : D

Q.17 In a 45° - 45° - 90° triangle if one of perpendicular side is 6, then the area of triangle is _____ square.units. **(1)**

A) 72   B) $6\sqrt{2}$

C) $36\sqrt{2}$ D) 18

Given triangle is isosceles triangle.

Two side of equal length.

$$\text{Area of triangle} = \tfrac{1}{2} \times 6 \times 6$$

$$= 18 \text{ unit}$$

Ans : D

Q.18 A triangle in which measures of angles are in the ratio $1:2:3$ is always **(1)**

(i) 30^0 - 60^0 - 90^0 triangle

(ii) 45^0 - 45^0 - 90^0 triangle
(iii) Equilateral triangle
(iv) Isosceles right angled triangle

A) (ii) and (iv)   B) None of the above

C) (iii)   D) (i)

Angles in the ratio 1 : 2 : 3
Let angles be x, 2x, 3x

Sum of angles = 180^0

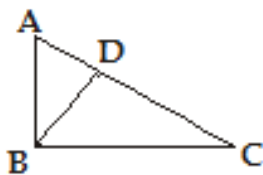   x + 2x + 3x = 180^0

           6x = 180^0

           x = 30^0

Hence angles are 30^0, 60^0, 90^0
Ans : D

Q.19 Apollonius theorem is applicable to a triangle only if **(1)**
(i) The triangle is right angled triangle.
(ii) The one of the altitude is given.
(iii) The median is given.
(iv) No condition exists.

A) (i)   B) (ii)

C) (iii)   D) (i) and (iii)

Ans : C

Q.20 In, $\Delta ABC, \angle B = 90^o$ seg $BD \perp$ side AC. Then which of following statement is as/are **(1)**
true?

A) BD^2 = AD × DC   B) $AB = \frac{1}{2}AC$

C) AB^2 = AD × BC   D) CB^2 = CD × AB

By using Theorem of Geometric Mean.
$\triangle$BDC $\sim$ $\triangle$ADB
$\frac{BD}{AD} = \frac{DC}{BD}$
$\therefore \ BD^2 = AD \times DC$
Ans : A

Q.21 ΔABC is an equilateral triangle of side 2a then its altitude will be _____. **(1)**

A) $\sqrt{15}\,a$ B) $\sqrt{2}\,a$

C) $\sqrt{6}\,a$ D) $\sqrt{3}\,a$

Area of triangle $= \frac{1}{2} \times$ base $\times$ height

Area of equilateral triangle $= \frac{\sqrt{3}}{4} \times$ side^2

Side of equilateral triangle = 2a

$\frac{\sqrt{3}}{4} \times 2a^2 = \frac{1}{2} \times 2a \times$ height

$\sqrt{3}a^2 = a \times$ height

height $= \sqrt{3}a$

Ans : D

Q.22　A man goes 15 m due east and then 8 m due north. How far is he from the starting point?　**(1)**

　　A) 16 m　　　　B) 17 m

　　C) 23 m　　　　D) 279 m

Distance between the start and the end point can be calculated by the sum of square root of the two distances travelled since west and
north directions are perpendicular to each.

Distance $= \sqrt{15^2 + 8^2} = \sqrt{225 + 64} = \sqrt{289} = 17\,\text{m}$

Ans : B

Q.23　Which of the following are Pythagorean triplet?　**(1)**

　　(i)　1, 1, $\sqrt{2}$

　　(ii) 13, 14, 15

　　(iii) 3, 4, 5

　　(iv) 30, 40, 50

　　A) Only (iii)　　　　B) (i) and (ii)

　　C) All the above　　D) (iii) and (iv)

Largest number = 5, Other numbers = 4 & 3

Square of largest number = 5^2 = 25　　　...(I)

Sum of square of remaining two numbers $= 3^2 + 4^2$

　　　　　　　　　　　　= 9 + 16

　　　　　　　　　　　　= 25 ...(II)

From (I) & (II)

3, 4, 5 is Pythagorean Triplet

Largest number = 50

Other number = 30 & 40

Square of largest number = 50^2 = 2500 ...(I)

Sum of square of remaining two numbers = $30^2 + 40^2$

　　　　　　　　　　　　= 900 + 1600

　　　　　　　　　　　　= 2500 ...(II)

From (I) & (II)

30, 40, 50 is Pythagorean Triplet

Ans : D