# CH 5 GEOMETRY

# ANSWERS AND EXPLANATIONS

## EXERCISE 1

1. (a) a + 36° + 70° = 180° (sum of angles of triangle)

$\Rightarrow$ a = 180° – 36° – 70° = 74°

b = 36° + 70°(Ext. angle of triangle ) = 106°

c = a – 50° (Ext. angle of triangle )

=74° – 50° = 24°.

2. (b) Since the sum of all the angle of a quadrilateral is 360°

We have $\angle$ ABC + $\angle$ BQE + $\angle$ DEF + $\angle$ EPB = 360°

$\therefore \angle$ ABC + $\angle$ DEF = 180°

[$\because$ BPE = EQB = 90° ]

3. (b) m $\angle$ AHG = 180 – 108 = $72^0$

$\therefore$ $\angle$ AHG = $\angle$ ABC .....(same angle with different names)

$\therefore$ $\Delta$ AHG – $\Delta$ABC .....(AA test for similarity)

$\frac{AH}{AB} = \frac{AG}{AC}$ ; $\frac{6}{12} = \frac{9}{AC}$

$\therefore AC = \frac{12 \times 9}{6} = 18$

$\therefore$ HC = AC – AH = 18 – 6 = 12

4. (b) In $\Delta ABC, \angle C = 180 - 90 - 30 = 60°$

$\therefore \Delta DCE = \frac{60}{2} = 30°$

Again in $\Delta DEC$, $\Delta CED = 180 - 90 - 30 = 60°$

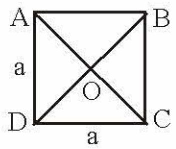
5. (c) In a right angled $\Delta$, the length of the median is $\frac{1}{2}$ the length of the hypotenuse . Hence $BD = \frac{1}{2} AC = 3cm.$

6. (a) $\angle D = 180 - \angle B = 180 - 70 = 110°$

$\therefore \angle ACD = 180 - \angle D - \angle CAD$

$180 - 110 - 30 = 40°$

7. (b)




ABCD is square $a^2 = 4 \Rightarrow a = 2$

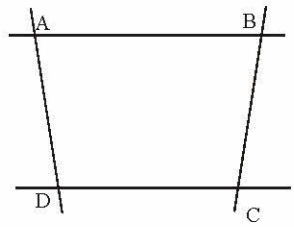
$ac = BD = 2\sqrt{2}$

perimeters of four triangles

$= AB + BC + CD + DA + 2(AC + BD)$

$= 8 + 2(2\sqrt{2} + 2\sqrt{2}) = 8(1 + \sqrt{2})$

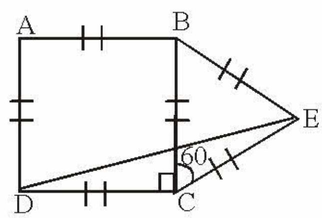
8. (d) The quadrilateral obtained will always be a trapeziam as it has two lines which are always parallel to each other.




9. (b) It is a rectangle.

(In a cyclic parallelogram each angle is equal to 90°. So, it is definitely either a square or a rectangle. Since the given cyclic parallelogram has unequal adjacent sides, it is a square.)

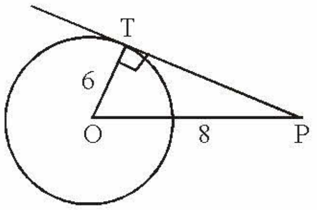
10. (a)



In $\Delta DEC, \angle DCE = 90° + 60° = 150°$

$$\angle CDE = \angle DEC = \frac{180-150}{2} = 15°$$

11. (e) OP = 8 cm, OT = 6 cm




$\therefore PT = \sqrt{OP^2 - OT^2} = \sqrt{8^2 - 6^2} = \sqrt{28}.$

12. (d) $\angle MBA = 180^0 - 95^0 = 85^0$

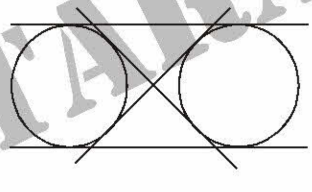
$\angle AMB = \angle TMN$ ...(Same angles with different names)

$\therefore \Delta MBA - \Delta MNT$ ......(AA test for similarity)

$\frac{MB}{MN} = \frac{AB}{NT}$ .......(proportional sides)

$\frac{10}{MN} = \frac{5}{9}$ $\therefore MN = \frac{90}{5} = 18.$

13. (a) Four tangents can be drawn to two non-intersecting circles in the following manner :



14. (c) Tangent at any point of a circle is $\perp$ to the radius

In $\Delta OPT$, $OP^2 = PT^2 + OT^2$

$(13)^2 = (12)^2 + OT^2$

$\Rightarrow$ $169 - 144 = OT^2$

$\Rightarrow$ $25 = OT^2 \Rightarrow 5 = OT$

15. (c) Let the angles of the triangle be 5x, 3x and 2x.

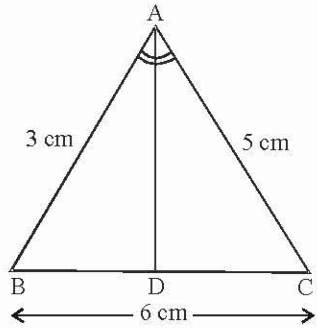
Now, 5x + 3x + 2x = 180°

or 10x = 180 or x = 18

or Angles are 36, 54 and 90°

Given $\Delta$ is right angled.

16. (b)




As AD bisects $\angle BAC$, we have

$\frac{BD}{AB} = \frac{DC}{AC}$ or $\frac{DC}{BD} = \frac{5}{3}$

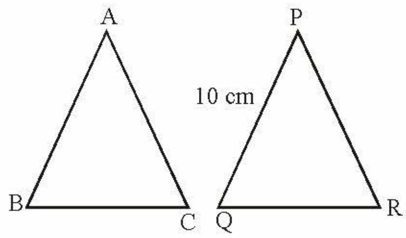
or $\frac{DC}{BD} + 1 = \frac{5}{3} + 1$

or $\frac{DC + BD}{BD} = \frac{5+3}{3}$

or $\frac{BC}{BD} = \frac{8}{3}$

or $BD = \frac{BC \times 3}{8} = \frac{6 \times 3}{8} = \frac{9}{4}$ = 2.25 cm

17. (d)




$\Delta ABC$ and $\Delta PQR$ are similar.

$$\frac{AB}{PQ} = \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR}$$

$$\Rightarrow \frac{AB}{PQ} = \frac{36}{24}$$

or $AB = \frac{36}{24} \times 10 = 15$

18. (c) We have,

$\angle OBC = \angle OCB = 37°$

(equal angles of an isosceles triangle)

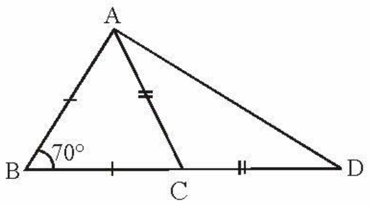
$\Rightarrow \angle COB = 180° - (37° + 37°) = 106°$

Therefore, $\angle BAC$

$= \frac{1}{2}\angle COB = \frac{106°}{2} = 53°$

19. (b) $\angle ACB = \angle BAC$

(Angles opposite equal sides are equal)




Similarly, $\angle ADC = \angle CAD$

$\therefore \angle ACB = \angle BAC$

$= \left(\frac{180° - 70°}{2}\right) = 55°$

$\Rightarrow \angle ADC = \angle CAD$

$= \frac{180° - 125°}{2} = 27.5°$

20. (b) The sum of the interior angles of a polygon of n sides is given by the expression $(2n - 4)\ \frac{\pi}{2}$

$\Rightarrow (2n-4)\times\frac{\pi}{2} = 1620\times\frac{\pi}{180}$

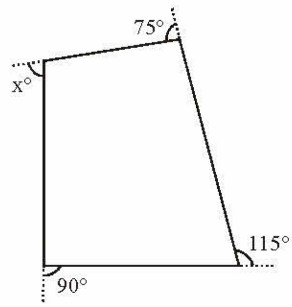
$(2n-4) = \frac{1620\times 2}{180} = 18$

or $2n = 22$ or $n = 11$

Thus the no. of sides of the polygon are 11.

# EXERCISE 2

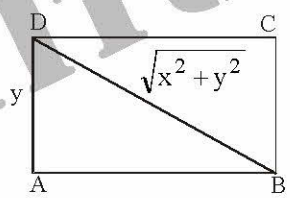
1. (c) Sum of all the interior angles of a polygon taken in order is 360°.




i.e. $x + 90 + 115 + 75 = 360$

or $x = 360° - 280° = 80°$ or $x = 80°$

2. (d)




According to question,

$(x+y) - \sqrt{x^2+y^2} = \frac{x}{2}$

$(x+y) - \frac{x}{2} = \sqrt{x^2+y^2}$

$\left(\frac{x}{2} + y\right)^2 = x^2 + y^2$

$\frac{x^2}{4} + y^2 + xy = x^2 + y^2$

$x^2 + 4xy = 4x^2$

$4xy = 3x^2 \Rightarrow 4y = 3x \Rightarrow \frac{y}{x} = \frac{3}{4}$