THIRUVANANTHAPURAM EDUCATIONAL DISTRICT

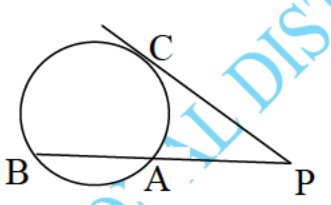
W S 7.2

MATHEMATICS **STANDARD: 10**

TANGENTS

1 In the figure the tangent at C and chord AB extended to meet at P.

AB = 5cm PC = 6cm. Find PB



We have AB = …… PC = ……

PA ×….. = ……

Let PA = x

PB = …… + …… = …… + ……

PA × PB = …… × ……

PC^2 = ……

…… × ….. = ……

x × (x + 5) = ……

x × ….. + x × 5 = …..

x^2 +5x- …… = 0

a = …… b = …… c = ……

$b^2 - 4ac = 5^2 - 4 \times \ldots\ldots \times \ldots\ldots$

= 25 + …… = …..

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-5 \pm \sqrt{\ldots\ldots}}{2 \times 1}$$

$$x = \frac{-5 + \sqrt{\ldots\ldots}}{2 \times 1}, \qquad \frac{-5 - \sqrt{\ldots\ldots}}{2 \times 1}$$

$$= \frac{-5+ \ldots\ldots}{2}, \frac{-5- \ldots\ldots}{2}$$

$$= \frac{8}{2}, \frac{-18}{2}$$

$$= \ldots\ldots, \ldots\ldots$$

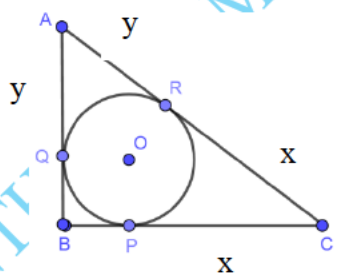
$\therefore$ PA = ….. PB = …… + …… = ……

2 In the figure ABC is a right triangle. BP = 3cm , hypotenuse of the triangle is 15cm. Find

(a) Inradius of the circle

(b) Perimeter of triangle

(c) Area of triangle



Given BP = ….. Hypotenuse of triangle = ……

In figure BQOP is a ……

$\therefore$ BQ = BP = OQ = OP = ……

$\therefore$ Inradius = ……

Perimeter of Δ ABC = AB+ ….. + …..

AB = ….. + ….. = ….. + ……

BC = ….. + ….. = ….. + ……

AC = ….. + ….. = …..

∴ Perimeter of Δ ABC = …… + …… + ……

= 3 + 3 + x + y + ……

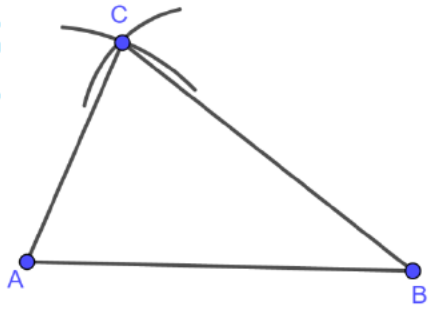
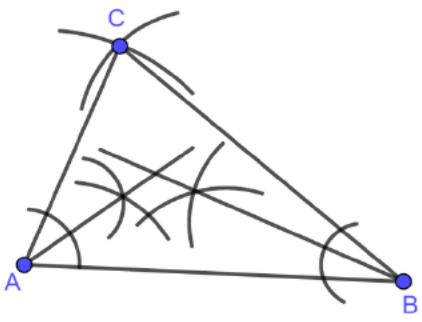
= …… + …… + …… = ……

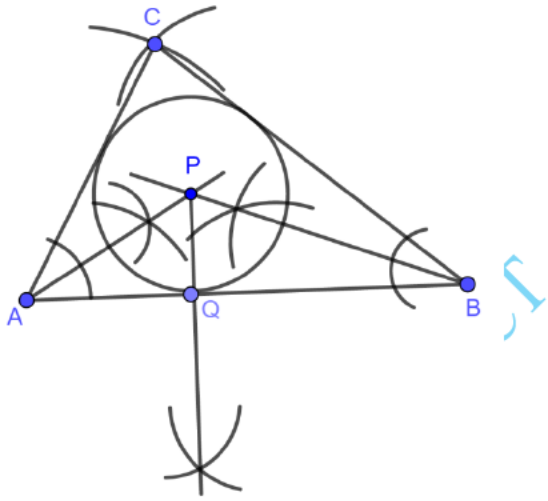
Semi perimeter = ……

Area = Inradius × ……

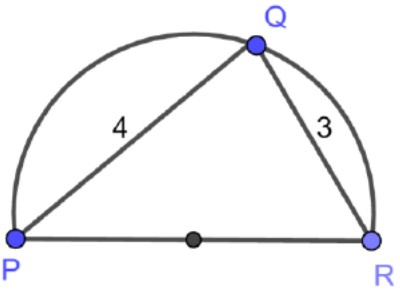
= 3× ….. = ……

3 Draw a triangle of sides 7cm , 6cm and 5cm. Draw its incircle and measure its inradius.

Draw Δ ABC with AB = 7cm BC = 6cm AC = 5cm	
Draw the angle bisector of ∠A and ∠B	

Draw a perpendicular from P to AB and construct the incircle with P centre and PQ radius Inradius = …..	

4 In the figure PR is the diameter of the semi circle. PQ = 4cm , QR = 3cm



a) ∠Q = …..

b) PR = …..

c) The inradius of ΔPQR = $\frac{A}{S}$

$$S = \frac{PQ+QR+PR}{2} = \frac{\ldots.+\ldots.+\ldots.}{2} = \ldots..$$

$$A = \frac{1}{2}bh$$

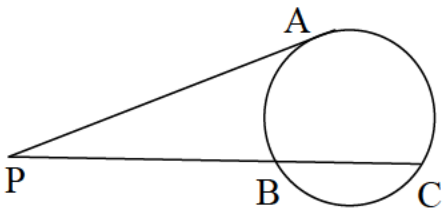
$$= \frac{1}{2} \times \ldots.. \times \ldots..$$

$$= \ldots\ldots$$

The inradius of $\Delta PQR = \frac{A}{S} = \frac{\ldots\ldots}{\ldots\ldots}$

$= \ldots\ldots$

5 In the figure PA is the tangent to the circle. If PB = 4cm , BC = 5cm then find the length of PA?



PB = ... cm

BC = ... cm

PC = PB + BC = ... + ... = ...cm

PA^2 = PB× PC

= ....

= .....

PA = $\sqrt{\ldots\ldots}$ = ...cm

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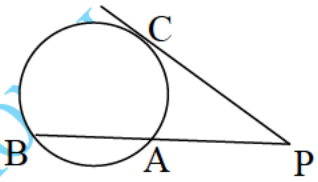
MATHEMATICS **STANDARD: 10**

TANGENTS

ANSWERS

1



We have AB = 5 PC = 6

$PA \times PB = PC^2$

Let PA = x

PB = PA + AB = x + 5

$PA \times PB = x \times (x+5)$

$PC^2 = 6^2$

$x \times (x+5) = 6^2$

$x \times (x + 5) = 36$

$x \times x + x \times 5 = 36$

$x^2 + 5x - 36 = 0$

a = 1 b = 5 c = -36

$b^2 - 4ac = 5^2 - 4 \times 1 \times -36$

$= 25 + 144 = 169$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-5 \pm \sqrt{169}}{2 \times 1}$$

$$x = \frac{-5 + \sqrt{169}}{2 \times 1}, \qquad \frac{-5 - \sqrt{169}}{2 \times 1}$$

$$= \frac{-5+13}{2\times1}, \quad \frac{-5-13}{2\times1}$$

$$= \frac{8}{2}, \frac{-18}{2}$$

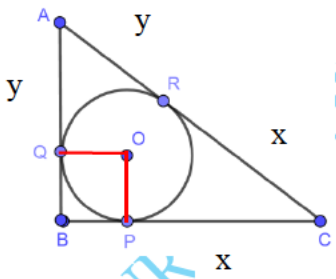
$$= 4, -9$$

$\therefore$ PA = 4 PB = PA + AB

= 4 + 5

= 9cm

2



Given BP = 3cm Hypotenuse of triangle = 15cm

In figure BQOP is a square

$\therefore$ BQ = BP = OQ = OP = 3

$\therefore$ Inradius = 3 cm

Perimeter of Δ ABC = AB+ BC + AC

AB = BQ + AQ = 3 + y

BC = BP + PC = 3 + x

AC = x + y = 15

$\therefore$ Perimeter of Δ ABC = 3+y + 3+x+ 15

= 3 + 3 + x + y + 15

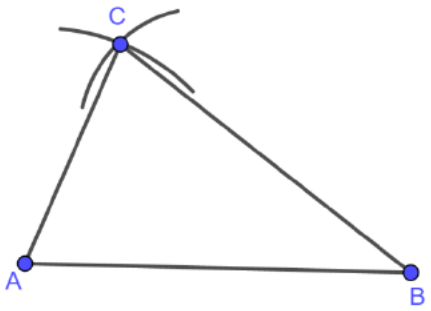
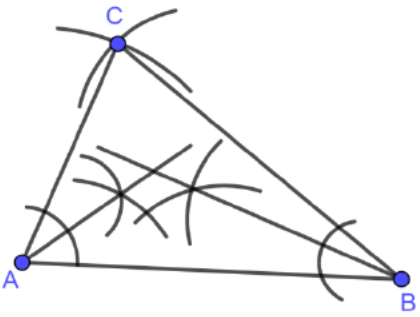
$= 6 + 15 + 15 = 36cm$

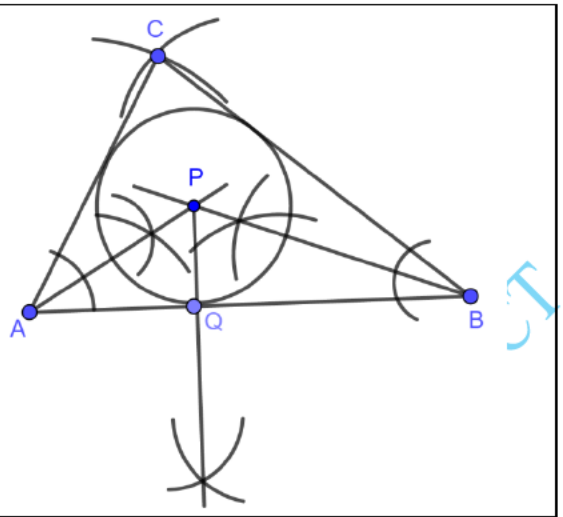
Semi perimeter = 18cm

Area = Inradius × Semi perimeter

$= 3 \times 18 = 54cm^2$

3

Draw Δ ABC with AB = 7cm BC = 6cm AC = 5cm	
Draw the angle bisector of ∠A and ∠B	

Draw a perpendicular from P to AB and construct the incircle with P centre and PQ radius Inradius = 1.6cm	

4 a) $\angle Q = 90^0$

b) PR = 5cm

c) The inradius of $\Delta PQR = \frac{A}{S}$

$$S = \frac{PQ+QR+PR}{2} = \frac{4+3+5}{2} = 6cm$$

$$A = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 3 \times 4$$

$$= 6cm^2$$

The inradius of $\Delta PQR = \frac{A}{S} = \frac{6}{6} = 1cm$

5 PB = 4 cm

BC = 5 cm

PC = PB + BC = 4 + 5 = 9cm

PA^2 = PB× PC = 4 × 9 = 36

PA = $\sqrt{36}$ = 6cm