MOST IMPORTANT QUESTIONS (POLYNOMIALS)

Q1 . Given that the zeroes of the cubic polynomial $x^3 - 6x^2 + 3x + 10$ are of the form a, $a + b$, $a + 2b$ for some real numbers a and b, find the values of a and b as well as the zeroes of the given polynomial.

Q2- Given that $\sqrt{2}$ is a zero of the cubic polynomial $6x^3 + \sqrt{2}\,x^2 - 10x - 4\sqrt{2}$, find its other two zeroes.

Q3-Find k so that $x^2 + 2x + k$ is a factor of $2x^4 + x^3 - 14x^2 + 5x + 6$. Also find all the zeroes of the two polynomials.

Q4-Given that $x - \sqrt{5}$ is a factor of the cubic polynomial $x^3 - 3\sqrt{5}x^2 + 13x - 3\sqrt{5}$, find all the zeroes of the polynomial.

Q5- For which values of a and b, are the zeroes of $q(x) = x^3 + 2x^2 + a$ also the zeroes of the polynomial $p(x) = x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$? Which zeroes of $p(x)$ are not the zeroes of $q(x)$?

MOST IMPORTANT QUESTIONS (LINEAR EQUATIONS IN TWO VARIABLES)

Q6-Find the values of x and y in the following rectangle

Q7-If $x+1$ is a factor of $2x^3 + ax^2 + 2bx + 1$, then find the values of a and b given that $2a-3b = 4$.

Q8- Two years ago, Salim was thrice as old as his daughter and six years later, he will be four years older than twice her age. How old are they now?

Q9- The age of the father is twice the sum of the ages of his two children. After 20 Years , his age will be equal to 20 years more than the sum of the ages of his children. Find the age of the father

Q10- Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5. Find the numbers.

Q11- There are some students in the two examination halls A and B. To make the number of students equal in each hall, 10 students are sent from A to B. But if 20 students are sent from B to A, the number of students in A becomes double the number of students in B. Find the number of students in the two halls.

Q12- A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for six days, while Anand paid Rs 16 for the book kept for four days. Find the fixed charges and the charge for each extra day

Q13- In a competitive examination, one mark is awarded for each correct answer while $\frac{1}{2}$ mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?

Q14-A person, rowing at the rate of 5 km/h in still water, takes thrice as much time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream.

Q15- A motor boat can travel 30 km upstream and 28 km downstream in 7 hours. It can travel 21 km upstream and return in 5 hours. Find the speed of the boat in still water and the speed of the stream.

Q16- A two-digit number is obtained by either multiplying the sum of the digits by 8 and then subtracting 5 or by multiplying the difference of the digits by 16 and then adding 3. Find the number.

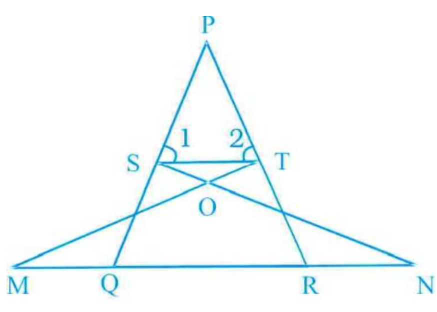
Q17- A railway half ticket costs half the full fare, but the reservation charges are the same on a half ticket as on a full ticket. One reserved first class ticket from the station A to B costs Rs 2530. Also, one reserved first class ticket and one reserved first class half ticket from A to B costs Rs 3810. Find the full first class fare from station A to B, and also the reservation charges for a ticket.

Q18- Susan invested certain amount of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. She received Rs 1860 as annual interest. However, had she interchanged the amount of investments in the two schemes, she would have received Rs 20 more as annual interest. How much money did she invest in each scheme?

Q19- Vijay had some bananas, and he divided them into two lots A and B. He sold the first lot at the rate of Rs 2 for 3 bananas and the second lot at the rate of Re 1 per banana, and got a total of Rs 400. If he had sold the first lot at the rate of Re 1 per banana, and the second lot at the rate of Rs 4 for 5 bananas, his total collection would have been Rs 460. Find the total number of bananas he had

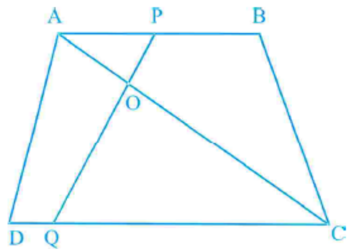
MOST IMPORTANT QUESTIONS (TRIANGLES)

Q20- In Fig. if $\angle 1 = \angle 2$ and $\Delta NSQ \cong \Delta MTR$, then prove that $\Delta PTS \sim \Delta PRQ$.



Q21-Diagonals of a trapezium PQRS intersect each other at the point O, PQ || RS and PQ = 3 RS. Find the ratio of the areas of triangles POQ and ROS.

Q22- **In Fig. if AB|| DC and AC and PQ intersect each other at the point O, prove that OA . CQ = OC . AP.**



Q23- **Find the altitude of an equilateral triangle of side 8 cm.**

Q24- **If Δ ABC ~ Δ DEF, AB = 4 cm, DE = 6 cm, EF = 9 cm and FD = 12 cm, find the perimeter of Δ ABC.**

Q25- **In Fig. , if ∠ACB = ∠CDA, AC = 8 cm and AD = 3 cm, find BD.**

Q26-In Fig. 6.16, if ∠A = ∠C, AB = 6 cm, BP = 15 cm,AP = 12 cm and CP = 4 cm, then find the lengths of PDand CD.

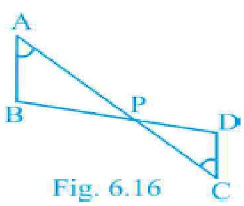
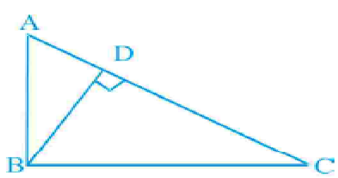


Fig. 6.16

Q27-For going to a city B from city A, there is a route via city C such that AC⊥CB,AC = 2 x km and CB = 2 (x + 7) km. It is proposed to construct a 26 km highwaywhich directly connects the two cities A and B. Find how much distance will besaved in reaching city B from city A after the construction of the highway.

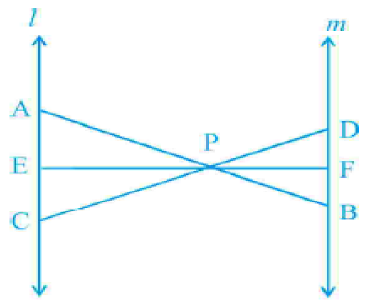
Q28-In Fig. , ABC is a triangle right angled at B and BD ⊥ AC. If AD = 4 cm, and CD = 5 cm, find BD and AB.



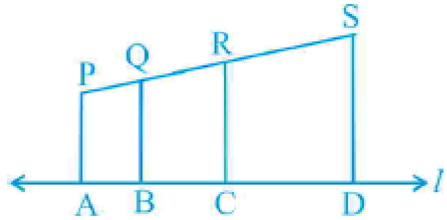
Q29-In Δ PQR, PD ⊥ QR such that D lies on QR . If PQ = a, PR = b, QD = c and DR = d, prove that (a + b) (a – b) = (c + d) (c – d).

Q30-In fig. , l || m and line segments AB, CD and EF are concurrent at point P.

Prove that $\frac{AE}{BF} = \frac{AC}{BD} = \frac{CE}{FD}$



Q31-In Fig. , PA, QB, RC and SD are all perpendiculars to a line *l*, AB = 6 cm, BC = 9 cm, CD = 12 cm and SP = 36 cm. Find PQ, QR and RS.



Q32- Prove that the area of the semicircle drawn on the hypotenuse of a right angled triangle is equal to the sum of the areas of the semicircles drawn on the other two sides of the triangle.

MOST IMPORTANT QUESTIONS (TRIGONOMETRY)

Q33- $\sqrt{(1-\cos^2\theta)\sec^2\theta} = \tan\theta$

Q34- $(\tan\theta + 2)(2\tan\theta + 1) = 5\tan\theta + \sec^2\theta$

Q35- $\tan\theta + \tan(90° - \theta) = \sec\theta \sec(90° - \theta)$

Q36 –If $2\sin^2\theta - \cos^2\theta = 2$, **then find the value of** θ

Q37- Show that $\frac{\cos^2(45+\theta)+\cos^2(45-\theta)}{\tan(60+\theta)\tan(30-\theta)} = 1$

Q38-If $\operatorname{cosec}\theta + \cot\theta = p$, **then prove that** $\cos\theta = \frac{p^2-1}{p^2+1}$

Q39- Prove that $\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \tan\theta + \cot\theta$

Q40-If $1 + \sin^2\theta = 3\sin\theta\cos\theta$ **, then prove that** $\tan\theta = 1$ **or** $\frac{1}{2}$

.Q41- Given that $\sin\theta + 2\cos\theta = 1$, **then prove that** $2\sin\theta - \cos\theta = 2$.

Q42-If $\tan\theta + \sec\theta = l$, **then prove that** $\sec\theta = \frac{l^2+1}{2l}$

Q43- If $\sin\theta + \cos\theta = p$ **and** $\sec\theta + \operatorname{cosec}\theta = q$, **then prove that** $q(p^2 - 1) = 2p$.

Q44- If $a\sin\theta + b\cos\theta = c$, **then prove that** $a\cos\theta - b\sin\theta = \sqrt{a^2+b^2-c^2}$

MOST IMPORTANT QUESTIONS (POLYNOMIALS)

Q1 . Given that the zeroes of the cubic polynomial $x^3 - 6x^2 + 3x + 10$ are of the form a, $a + b$, $a + 2b$ for some real numbers a and b, find the values of a and b as well as the zeroes of the given polynomial.

x = -1 is a factor of $x^3 - 6x^2 + 3x + 10$

$(-1)^3 - 6(-1)^2 + 3(-1) + 10 = 0$

$$
\begin{array}{r|l}
x+1 & \;\cancel{x^3} - 6x^2 + 3x + 10 \quad (\, x^2 - 7x + 10 \\
 & \;\cancel{x^3} + x^2 \\
 & - \quad - \\
\hline
 & \quad - 7\cancel{x^2} + 3x + 10 \\
 & \quad - 7\cancel{x^2} - 7x \\
 & \quad + \quad + \\
\hline
 & \qquad \cancel{10x} + \cancel{10} \\
 & \qquad \cancel{10x} + \cancel{10} \\
 & \qquad - \quad - \\
\hline
 & \qquad\quad 0
\end{array}
$$

$x^2 - 7x + 10$

$(x-5)(x-2)=0$

X=5 ,2

So that x= -1

a = -1

if a = 5 a+b =2 b = 2-5 = -3

Q9- The age of the father is twice the sum of the ages of his two children. After 20 Years , his age will be equal to 20 years more than the sum of the ages of his children. Find the age of the father

let the age of father = x

sum of the ages of children = y

A.T.Question

X = 2y

X -2y=0 ----------------------------(1)

After 20 years

X +20 = (y +20) +20

X – y = 20 ------------------------(2)

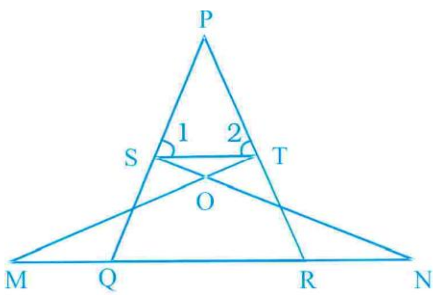
By simplifying (1) and (2) , we get

X= 40 , y = 20

Age of father = 40 years

MOST IMPORTANT QUESTIONS (TRIANGLES)

Q20- In Fig. if $\angle 1 = \angle 2$ and Δ NSQ $\cong \Delta$ MTR, then prove that Δ PTS ~ Δ PRQ.



IN Δ PTS and Δ PRQ

$\angle 1 = \angle Q$ ------------------------(corresponding angles)
$\angle 2 = \angle R$ ------------------------(corresponding angles)
$\angle P = \angle P$ ------------------------(common)

Δ PTS $\sim \Delta$ PRQ

Q36 –If $2\sin^2 \theta - \cos^2 \theta = 2$, then find the value of θ

$2\sin^2 \theta = 2 + \cos^2 \theta$

$2\sin^2 \theta = 2 + (1 - \sin^2 \theta)$
$3\sin^2 \theta = 3$

$\sin \theta = 1 \qquad \theta = 90^0$

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