THE ASIAN SCHOOL, DEHRADUN

Test Paper Session 2017-18

CLASS 10 SUBJECT Mathematics CHAPTER- 1

Ans1	1000	1
Ans2	xy^2	1
Ans3	13	1
Ans4	24	1
Ans5	12	2
Ans6	7x 6 x 5 x 4 x 3 x 2 x 1 + 7 = 7 (6x 5x 4x 3x 2x 1+1) = 7 x 721 x 1 Because it has more than 2 factors so, it is a composite number.	2
Ans7	Similar to Question 6	2
Ans8	$a = 2^5 \times 3^7 \times 5^2 \times 7$ $b = 2^3 \times 3^2 \times 5^6 \times 11$ $HCF= 2^3 \times 3^2 \times 5^2$ $LCM=2^5 \times 3^7 \times 5^6 \times 7 \times 11$	2
Ans9	Similar to Question 6	2
Ans10	LCM of 9,12,15 in 180 min. The bells will tolltogether again after 3 hrs.	2
Ans11	$\frac{91}{1250} x \frac{91}{5^4 2^1} = 0.0728$	2
Ans12	Let $\frac{1}{2+\sqrt{3}}$ is rational $\frac{1}{2+\sqrt{3}} = \frac{a}{b}$ HCF of a and b in 1 $\sqrt{3} = \frac{b-2a}{a}$ $\frac{b-2a}{a}$ is a rational no. as a, b are integers $=\sqrt{3}$ in rational But $\sqrt{3}$ is irrational ∴ It is a contradiction ∴ourassumption is wrong that $\frac{1}{2+\sqrt{3}}$ is rational∴it is irrational no.	2
Ans13	Similar to Question 12	3
Ans14	Let a is any +ve odd integer, Let b = 4 By E.D.L a = bq + r , 0 ≤ r <b Let b = 4 a = 4a + r, 0 ≤ r <4 a = 4a + 0 = 4a even a = 4a + 2 odd a = 4a + 2 even a = 4a + 3 odd ∴ a = (4a+1) , (4a+3) H.P	3
Ans15	(1) 608 , 544 By E.D.L. 608 = 544 x 1 + 64 Now, 544, 64 By E.D.L. 544 = 64 x 8+ 32 Now, 64, 32 ∴ 64 = 32 x 2 + 0 ∴HCF= 32 (ii) Same as part (i) (iii) Same as part (ii)	3
Ans16	HCF = 9 LCM = 90, a = 18,b =? a x b = HCF x LCM	3

	18 x b = 9x 90 b =45	
Ans17	($\sqrt{3}$ + $\sqrt{2}$is Prove $\sqrt{3}$ is irrational by method of contradiction. Prove $\sqrt{2}$ is irrational by method of contradiction. ∴ $\sqrt{2}$ + $\sqrt{3}$ is irrational. ∴sum of two irrational , is irrational.	3
Ans18	HCF of 726, 275 By EDL 726 = 275 x 2 + 176 275 and 176 By ED L 275 = 176 x 1 + 99 176 and 99 ∴ by EDL 176 = 99x 1 + 77 99 = 77 x 1 + 22 And so on At last HCF = 11	3
Ans19	Same as answer 18	3
Ans20	Boys = 20 Girls = 15 No of graph = n HCF of boys and girls = 5 No of graphs of boys = $\frac{20}{5}$ = 4 = x No of groups of girls = $\frac{15}{5}$ = 3 = y No. of groups = 4 + 3 = 7 = n	3

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CLASS 10 SUBJECT Mathematics CHAPTER- 2 Polynomials

Ans1	Deg p (x) < {deg g(x)	1
Ans2	S = -3+4 = 1 , P = -3x4 = -12 ∴ Required polynomial = $x^2 - x - 12$	1
Ans3	S = -(-5) = 5 A + B = 5 B = 5 – 6 = -1	1
Ans4	let f(x) = x^2 - 5x + 4 f(3) = 32 – 5 x 3 +4 = -2 for f(b) = 0, 2 must be added to f(x)	1
Ans5	Let one root be x then other root will be – x ∴ S = x + (-x) = 0 $\frac{-b}{a} = \frac{8k}{4} = 0$ K = O	2
Ans6	(K-1) $(-3)^2$ + K (-3) + 1 = 0 Solving we will get K = $\frac{4}{3}$	2
Ans7	A+B = 5 and AB= 6 ∴ A+B – 3AB = 5 -3x6 = 5-18 = -13	2
Ans8	$4x^2 - 12x + 9 = (2x-3)^2 = 0$ x = $\frac{3}{2}, \frac{3}{2}$	2
Ans9	A +B = -1, AB = -1, so $\frac{1}{A} + \frac{1}{B} = \frac{A+B}{AB} = \frac{-1}{-1}$ =1	2
Ans10	$a(1)^2$ – 3 (a-1) (1) -1 = 0 a – 3a+3 – 1= 0 a=1	2
Ans11	$\alpha + \beta$ = -1/4 $\alpha\beta$ =1/4 ∴ Req. Polynomial ¼ (4x2 + x+1)	2
Ans12	$\alpha + \beta = \sqrt{2}$ $\alpha\beta$ = 1/3 ∴ Req. polynomial 3x2 - 3$\sqrt{2}$ x +1	2
Ans13	On solving 6x2 – 3-7x we get factors (2x-3) (3x+1) Thus α = 3/2 β = -1/3	3
Ans14	On dividing $3x^4 + 5x^3 - 7x^2 + 2x + 2$ by $x^2 + 3x + 1$ we get, $3x^2 - 4x + 2$ as quotient and 0 as remainder. So, $x^2 + 3x + 1$ is a factor of the given polynomial	3
Ans15	From $2x^2 - 5x + 7$, $\alpha + \beta$ = 5/2 and $\alpha\beta$ = 7/2 For required polynomial : S = (2 $\alpha + 3\beta$) + $3\alpha + 2\beta$ =5 $\alpha + 5\beta$ = 5 ($\alpha + \beta$) = 5x 5/2 = 25/2 P = $(2\alpha + 3\beta)(3\alpha + 2\beta)$ = 6α2 + 6 β2 + 13$\alpha\beta$ = 6 $\alpha^2 + 6\beta^2$ + 12 α β+ α β = 6($\alpha^2 + \alpha\beta^2$ + 2 α β) + α β = 6 $(\alpha+\beta)^2$ + α β = 6 $(5/2)^2$ + 7/2 = 41 ∴ Required polynomial = K (x^2 –S x + P) = K ($x^2 - \frac{25x}{2}$+ 41 where k is any non zero real number.	3
Ans16	On dividing $8x^4 + 14x^3 - 2x^2 + 7x - 8$ by $4x^2 + 3x - 2$ we get $2x^2 + 2x - 1$ as quotient and 14x – 10 –y as remainder. ∴ Remainder should be 0. ∴ 14x – 10 – y = 0 y = 14x -10 should be subtracted from given polynomial/	3
Ans17	f(x) = $\sqrt{3}\,x^2 - 8x + 4\sqrt{3}$=0 (x - 2$\sqrt{3}$) ($\sqrt{3}x$-2) = 0	3

	X = 2 $\sqrt{3}$ or x = $\frac{2}{\sqrt{3}}$ S = 2$\sqrt{3}$ + $\frac{2}{\sqrt{3}}$ = $\frac{8}{\sqrt{3}}$ = $\frac{-coeff.of\ x}{coeff\ of\ x^2}$ P = 2$\sqrt{3}$ x $\frac{2}{\sqrt{3}}$ = $\frac{4\sqrt{3}}{\sqrt{3}}$ = $\frac{-constant\ terms}{coeff\ .of\ x^2}$ Hence verified	
Ans18	Let f(y) = $6y^2 - 7y + 2$ S = $\frac{7}{6}$ P = $\frac{1}{3}$ $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta+\alpha}{\alpha\beta} = \frac{7/6}{1/3} = \frac{7}{2}$ $\frac{1}{\alpha}$ x $\frac{1}{\beta} = \frac{7}{1/3} = 3$ Required polymonail = y^2 - 7/2 y + 3 = ½ (2y2 – 7y + 6)	3
Ans19	B = 7α than, S = 8 α $-\left(\frac{-8}{3}\right) = 8\,\alpha$ = $\alpha = \frac{1}{3}$ P = 7 $\alpha^2 = \frac{2K+1}{3}$ $7(1/3)^2 = \frac{2K+1}{3}$ = K = 2/3	3
Ans20	Let f(x) = $x^4 + 2x^3 + 8x^2 + 12x+18$ and g(x) = $x^2 + 5$ In dividing f(x) by g(x) we get q(x) = $x^2 + 2x + 3$ and r(x) = 2x+3 on comparing the remainder with px+q, Px + q = 2x+3 P = 2 q = 3	3
Ans21	By division algorithm, we have f(x) =g(x) x q(x) + r(x) f(x) – r (x) = g(x) x q(x) f(x) + {-r(x)} = g(x) x q(x) on dividing f(x) by g(x) we get q(x) = $4x^2$ - 6x+ 22 and r(x) = -61x+ 65 ∴ We should add –r(x) = 61x – 65 to f(x) so that the resulting polynomial is divisible by g(x).	4
Ans22	Let p(x) = $2x^2 + 3x + \lambda$ P(1/2) = 2 $(1/2)^2$ + 3x1/2 + λ = 0 λ = -2 $\alpha + \frac{1}{2} = \frac{-3}{2}$ α= -2	4
Ans23	Let α and $\frac{1}{\alpha}$ be the zeroes P = α x 1/ α = 1= $\frac{6a}{a^2+9}$= a=3	4
Ans24	∴ $\sqrt{\frac{5}{3}}$ and $\sqrt{\frac{-5}{3}}$ are zeroes so, $\left(x-\sqrt{\frac{5}{3}}\right)\left(x-\sqrt{\frac{5}{3}}\right)$ = x^2- = $\frac{5}{3}$ is factor of the given polynomial on dividing the given polynomial by $x^2 - \frac{5}{3}$ we get $3x^2$ + 6x + 3 as q(x) and remainder 0 3(x+1) (x+1) Other zeros are -1, -1	4
Ans25	From polynomial , $6x^2$ + x-1 $\alpha + \beta$ = - 1/6 $\alpha\,\beta$ = - 1/6 $\alpha^3\beta + \alpha\beta^3$ $\alpha\beta\ (\alpha^2+\beta^2)$ $\alpha\beta\ [(\alpha+\beta)^2 - 2\,\alpha\beta]$ $-\frac{1}{6}\,[(-1/6)^2 - 2\,(-1/6)]$ $-\frac{1}{6}$ [1/36 + 1/3] $-\frac{1}{6}$ x $\left(\frac{1+12}{36}\right)$ $-\frac{13}{216}$	4
Ans26	If $\sqrt{3}$ is a zero of given polymonial then x - $\sqrt{3}$ must be its factor : on dividing x3+x2- 3x-3by x-$\sqrt{3}$ we get $x^2 + (\sqrt{3} + 1)\,x + \sqrt{3}$ as quotient and zero as reminder.	4

	$x^2 + (\sqrt{3} + 1)\ x + \sqrt{3}$ $x^2 + \sqrt{3}\ x + x + \sqrt{3}$ $x(\ X+\sqrt{3}x + 1\ (X + \sqrt{3}$ $(x + \sqrt{3})\quad (x - 1)$ $\therefore$ other zero are $-\sqrt{3}, -1$.	
Ans27	$(x - 2 + \sqrt{3})\ \ (\ x - 2- \sqrt{3})$ as factor on dividing given polynomial by it we get $x^2 - 2x - 35$ $\therefore$ other zeros are -5 and 7	4
Ans28	On dividing ax3 +bx-c by $x^{\ 2} + bx + c$ we get ax-ab as quotient and $-acx + bx + ab^2x + abc - c$ as reminder. $-acx + bx + ab^2x + abc - c$ $x\ (ab^2 - ac + b) + c(ab-1) = 0$ = 0 = ab = 1 To make the remainder zero, ab = 1	4

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CLASS 10 SUBJECT Mathematics CHAPTER- 3 Pair of Linear Equations in two variables

Ans1	$\frac{b}{2} = \frac{2k}{5} \neq -\frac{2}{1}$ for parallel lines K = 15/4	1
Ans2	Intersecting point will be (0,y) x- y = 8 0-y = 8 Y = -8 ∴ Required pt is (0,-8)	1
Ans3	On dividing $x^2 - 5x - 6$ by x-6 we get x + 1 as quotient and zero as remainder ∴other zero is -1	1
Ans4	$\frac{4}{12} = \frac{3}{9} \neq \frac{6}{15} \Rightarrow \frac{a1}{a2} = \frac{b1}{b2} \neq \frac{c1}{c2}$ ∴ equations do not represent a pair of coincident lines.	1
Ans5	Yes, $\frac{a1}{a2} = \frac{2a}{4a} = \frac{1}{2}, \frac{b1}{b2} = \frac{b}{2b} = \frac{1}{2}, \frac{c1}{c2} = \frac{-a}{-2a} = \frac{1}{2}$ ∴ equations are consistent	2
Ans6	$\frac{a1}{a2} = \frac{1}{6}, \frac{b1}{b2} = \frac{-1}{6} \Rightarrow \frac{a1}{a2} \neq \frac{b1}{b2}$ so it has a unique solution and is consistent.	2
Ans7	$\frac{a1}{a2} = \frac{5}{7}, \frac{b1}{b2} = \frac{-2}{3} \Rightarrow \frac{a1}{a2} = \frac{b1}{b2}$ so it has a unique solution and is consistent .	2
Ans8	$\frac{a1}{a2} = \frac{2}{3}, \frac{b1}{b2} = \frac{2}{3} = \frac{c1}{c2} = \frac{2}{3} \Rightarrow \frac{a1}{a2} = \frac{b1}{b2} = \frac{c1}{c2}$ = coincident lines.	2
Ans9	$\frac{a1}{a2} = \frac{9}{18} = \frac{1}{2}, \frac{b1}{b2} = \frac{1}{2}, \frac{c1}{c2} = \frac{1}{2} \Rightarrow \frac{a1}{a2} = \frac{b1}{b2} = \frac{c1}{c2}$ = coincident lines.	2
Ans10	$\frac{a1}{a2} = 3\ \frac{b1}{b2} = 3\ \frac{c1}{c2} = \frac{10}{9}$ $\frac{a1}{a2} = \frac{b1}{b2} \neq \frac{c1}{c2}$ = parallel lines	2
Ans11	For coincident lines $\frac{a1}{a2} = \frac{b1}{b2} = \frac{c1}{c2}$ $\frac{k+1}{5} = \frac{3k}{k} = \frac{15}{5}$ $\frac{k+1}{5} = 3$ k = 14	2
Ans12	For no solution : $\frac{a1}{a2} = \frac{b1}{b2} \neq \frac{c1}{c2}$ $\frac{k}{12} = \frac{3}{k} = \frac{-(k-3)}{-k}$ $K^2 = 36$ K = 6	2
Ans13	x = 1 , y= - 1	3
Ans14	x = 2, y = 1	3
Ans15	$\frac{2}{a-b} = \frac{3}{a+b} = \frac{7}{3a+b-2}$ a=5b a-2b=3 5b – 2b = 3 b = 1 so a = 5	3
Ans16	$\frac{a1}{a2} = \frac{7}{5}, \frac{b1}{b2} = \frac{2}{3}$ $\frac{a1}{a2} \neq \frac{b1}{b2}$ ∴ unique solution. On solving the equations we get, x = 3 and y = -7	3
Ans17	x +3x + y = 180 4x + y = 180 - (i) 3y – 5x = 30 (ii) On solving (i) and (ii) x = 30 $\angle A = 30^0, \angle B = 90^0\ \angle C = 60^0$	3

Ans18	Let $\frac{1}{x-1}$ = p and $\frac{1}{y-2}$ = q The given equation becomes, 6p – 3q = 1 (i) 5p + q = 2 (ii) on solving (i) and (ii) we get, P = $\frac{1}{3}$ and q = $\frac{1}{3}$ $\frac{1}{x-1} = \frac{1}{3}$ $\frac{1}{y-2} = \frac{1}{3}$ x = 4 y = 5	3
Ans19	Let A's present age be x years and B's present age by y years. Five years ago, A = (x – 5) years B (y-5) years (x-5) = 3 (y-5) 3y – x = 10 (i) Ten years hence, A = x + 10 B y + 10 x + 10 = 2 (y+10) 2y –x = -10 (ii) On solving (i) and (ii) we get, x = 50 years and B = 20 years	3
Ans20	Let the number be x and demo be y then fraction becomes $\frac{x}{y}$ $\frac{x-1}{y} = \frac{1}{3}$ 3x – y = 3 (i) $\frac{x}{y+8} = \frac{1}{4}$ 4x – y = 8 (ii) On solving (i) and (ii) we get x = 5- 12 so require fractions 5/12.	3
Ans21	2x + 4y = 10 y = $\frac{5-x}{2}$ x 1 3 5 y 2 1 0 3x + 6y = 12 y = $\frac{4-x}{2}$ x 2 0 4 y 1 2 0 on drawing the graphs we obtain parallel lines i.e. no solution.	4
Ans22	By elimination method, 3x – 5y = 4 (i) 9x – 2y = 7 (ii) Multiply eq (i) by 3, we get 9x- 15y = 12 (iii) 9x – 2y = 7 (ii) Subtracting (ii) from (iii) we get, 9x – 15y = 12 9x – 2y = 7 -13y = 5 Y = -5/13 Putting the value of y in equation i(i) we have, 9x – 2 $\left(\frac{-5}{13}\right)$ = 7 x = $\frac{9}{13}$ ∴ required solution is x = $\frac{9}{13}$, y = $\frac{-5}{13}$	4
Ans23	Let the digits at units place be x and tens place be y then number becomes 10 y + x No. formed by inter changing the digits = 10x + y (10y + x) + (10x + y) = 110 x + y = 10 (i) 10 y + x – 10 = 5 (x + y) + 4 4 x – 5 y = - 14 (ii) On solving (i) and (ii) x = 4 y = 6 ∴ NO is 10x6 + 4 = 64	4

Ans24	Let CP of table be Rs x and Cp of chair be Rs y. A/c to I condition, S.P of table = x + $\frac{10x}{100} = \frac{100x}{100}$ S.P of chairs = y + $\frac{25y}{100}$ So, $\frac{1to\ x}{100} + \frac{125y}{100}$ = 1050 – (i) A/C to 2nd condition, S.P of table = x+ $\frac{25x}{100} = \frac{125x}{100}$ S.P o of chair = y + $\frac{10y}{100} = \frac{110y}{100}$ So, $\frac{125}{100}$x + $\frac{110y}{100}$ = 1065 = (ii) On solving (i) and (ii) we get x = 500, y = 400 ∴ cp of table of Rs 500 and cp of chair is Rs 400.	4
Ans25	Let one man alone can finish the work is x days and one boy can finish the work in y days then. One day work of one man = $\frac{1}{x}$, One day work of one boy = $\frac{1}{y}$ ∴ one day work of 8 men = $\frac{8}{x}$, one day work of 12 boys = $\frac{12}{y}$ A/c to question, 10 $\left(\frac{8}{x} + \frac{12}{y}\right)$= 1 $\frac{80}{x} + \frac{120}{y}$= 1 (1) and 14 $\left(\frac{6}{xx} + \frac{8}{y}\right)$= 1 $\frac{84}{x} + \frac{122}{y}$= 1 (2) Now, put $\frac{1}{x}$ = u and $\frac{1}{y}$ = v in eq (1) and (2) we get 80u + 120v = 1 and 84u + 112 v = 1 By using cross multiplication, we have $\frac{u}{-120+112} = \frac{-v}{-80+84} = \frac{1}{80x112-84\ x\ 120}$ On solving further, u = $\frac{1}{140}$ and v = $\frac{1}{280}$ $\frac{1}{x} = \frac{1}{140}$ $\frac{1}{y} = \frac{1}{280}$ x = 140 y = 280 ∴ one man alone can finish the work in 140 days and one boy is 280 days.	4
Ans26	x = 2 , y = -1	4
Ans27	Rs 10, Rs 15	4
Ans28	(0,0), (4,4), (6,2)	4

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CLASS 10 SUBJECT Mathematics Chapter 4 Quadratic Equations

Ans1	$D = b^2 – 4ac = (-b)^2 - 4(6)(2) = b^2 - 48$ $b^2 – 48 = 1$ $b^2 = 49$ $b = \pm 7$	1
Ans2	$\sqrt{2x^2 + 9} = 9$ Squaring both sides $2x^2 + 9 = 81$ $2x^2 = 72$ $x^2 = 36$ $x = \pm 6$	1
Ans3	$\left(\frac{1}{2}\right)^2 + K\left(\frac{1}{2}\right) - \frac{5}{4} = 0$ K=2	1
Ans4	For equal roots D = 0 $b^2 – 4ac = 0$ $(1)^2 – 4xKxK = 0$ $1 - 4k2 = 0$ $K = \pm \frac{1}{2}$	1
Ans5	D = 0 $b2 – 4ac = 0$ $(-2k)^2 – 4(k)(6) = 0$ $4k^2 – 24k = 0$ $4k(k-6) = 0$ K = 0,6	2
Ans6	$10x - \frac{1}{x} = 3$ $10x^2 – 1 = 3x$ $10x^2 – 3x – 1 = 0$ $10x^2 – 5x + 2x - 1 = 0$ $5x(2x-1) + 1(2x-1) = 0$ $x = -\frac{1}{5}, ½$	2
Ans7	$15x^2 - 10\sqrt{6}x + 10 = 0$ $5(3x^2 – 2\sqrt{6}x + 2) = 0$ $3x^2 - \sqrt{6}x - \sqrt{6}x + 2 = 0$ $\sqrt{3}x(\sqrt{3}x - \sqrt{2}) - \sqrt{2}(\sqrt{3}x - \sqrt{2}) = 0$ $(\sqrt{3}x - \sqrt{2})\ \sqrt{3}x - \sqrt{2} = 0$ $x = \sqrt{\frac{2}{3}}, \sqrt{\frac{2}{3}}$	2
Ans8	$D = b^2 – 4ac$ $(10)^2 – 4x13\sqrt{3} x \sqrt{3}$ = 100 – 156 = -56 No real roots	2
Ans9	$\frac{1}{a + b + x} = \frac{bx + ax + ab}{abx}$ abx = (bx+ax+ab) (a+b+x) $abx=abx+b^2x + bx^2 + a^2x + abx + ax^2+ a^2b + ab^2 + abx$ $0 = bx^2 + ax^2 + b^2x + a^2x + 2abx + a^2b+ab^2$ $= x^2(a+b) + x(a^2+b^2+2ab) + ab(a+b)$ $= (a+b)[x^2 + x(a+b)+ab]$ $= x^2 + ax + bx + ab$ $= x(x+a) + b(x+a)$	2

	0 = (x+ b) (x + a) x = -b, -a	
Ans10	$3x^2 - 2\sqrt{6}x + 2 = 0$ $3x^2 - \sqrt{6}x - \sqrt{6}x + 2 = 0$ $x = \sqrt{2/3}, \sqrt{2/3}$	2
Ans11	$abx^2 + (b^2 – ac) x – bc = 0$ $abx^2 + b^2x – acx – bc = 0$ bx (ax +b) – c(ax + b) 0 x = c/b, -b/a	2
Ans12	$4\sqrt{5}x^2 – 17x + 3\sqrt{5} = 0$ $4\sqrt{5}x^2 – 5x – 12x + 3\sqrt{5} = 0$ $\sqrt{5}x(4x – \sqrt{5}) – 3(4x – \sqrt{5}) = 0$ $(\sqrt{5}x – 3)(4x – \sqrt{5}) = 0$ $x = 3/\sqrt{5}, \sqrt{5}/4$	2
Ans13	$ax^2 + a = a^2x + x$ $ax^2 – (a^2+1) x + a = 0$ $ax^2 – a^2x – x + a = 0$ ax(x –a) -1 (x –a) = 0 (x-a) (ax-1) = 0 x = a, 1/a	3
Ans14	$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ $4\sqrt{3}x^2 + 8x – 3x - 2\sqrt{3} = 0$ $4x(\sqrt{3}x + 2) - \sqrt{3}(\sqrt{3}x + 2) = 0$ $(4x - \sqrt{3})(\sqrt{3}x+2) = 0$ $x = \frac{\sqrt{3}}{4}, \frac{-2}{\sqrt{3}}$	3
Ans15	For real and equal roots D = 0 $x^2 + kx + 64 = 0$ $D = b^2 – 4ac = 0$ $k^2 – 256 = 0$ $k = \pm 16$ $x^2 – 8x + k = 0$ D = b2 – 4ac = 64 – 4k = 0 k = 16	3
Ans16	D = b2 – 4ac = 48 – 48 =0 Roots are real and equal $3x^2 - 4\sqrt{3}x + 4 = 0$ $3x^2 - 2\sqrt{3}x - 2\sqrt{3}x + 4 = 0$ $(\sqrt{3}x-2)(\sqrt{3}x-2) = 0$ $x = \frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}$	3
Ans17	$(c-a)^2 – 4(b-c)(a-b) = 0$ $c^2 + a^2 – 2ac – 4(ba-b^2 – ac + bc) = 0$ $c^2 + a^2 – 2ac – 4ba + 4b^2 + 4ac – 4bc = 0$ $c^2 + a^2 + 2(a)(c) – 2(2b)(a) + (2b)^2 + 2(2b(c) = 0$ $(c + a – 2b)^2 = 0$ c+a = 2b	3
Ans18	$x^2 + (x+1)^2 = 421$ $x^2 + x^2 + 2x+1 = 421$ $2x^2 + 2x – 420 = 0$ $x^2 + x – 210 = 0$	3
Ans19	$\frac{x+1}{x-1} + \frac{x-2}{x+2} = 3$ $x^2 + 3x – 10 = 0$ x= 2 , -5	3
Ans20	$x = \frac{+6 \pm \sqrt{36+40}}{10} = \frac{-6 + \pm\sqrt{76}}{10}$	3

	$= \frac{+6\pm2\sqrt{19}}{10} = \quad = \frac{-3+\pm19}{10}$	
Ans21	Let x be the usual speed, $\frac{300}{x} - \frac{300}{x+5} = 2$ x = -30 , 25 ∴ usual speed of the train = 25 km/hrs	4
Ans22	$\frac{1}{2} \times 5x \times (3x-1) = 60$ x = 3, -8/3 L = 5x3 = 15, B = (3x-1) = 8 $H = \sqrt{L^2 + B^2} = \sqrt{15^2 + 8^2} = 17$ cm	4
Ans23	$\frac{6500}{x+15} + 30 = \frac{6500}{x}$ $x^2 + 15x - 3250 = 0$ (x + 65) (x-50) = 0 x = -65, + 50 ∴ neglecting negative number, x= 50	4
Ans24	Let num. be x and then deno is x+2 and fraction is $\frac{x}{x+2}$ $\frac{x}{x+2} + \frac{x+2}{x} = \frac{34}{15}$ $x^2 + 2x - 15 = 0$ (x +5) (x-3) x = 3 neglecting negative value. ∴ fraction = $\frac{3}{5}$	4
Ans25	Let B alone takes x days to finish the work and A alone takes x- 6 days. A/c to question, $\frac{1}{x} + \frac{1}{x-6} = \frac{1}{4}$ $x^2 - 14x + 24 = 0$ (x-12) (x-2) = 0 x = 12, 2 But x cannot be less than 6 so we take x = 12 ∴ B can finish the work in 12 days.	4
Ans26	Let the speed of stream is x km/hr Speed in upstream = (15-x) km/hr speed in down stream = (15+x) km/hr $\frac{30}{15+x} + \frac{30}{15-x} = 4\frac{1}{2}$ $-x^2 + 225 - 200 = 0$ x = ±5 ∴speed of stream = 5 km/hr	4
Ans27	Let time taken by tap of larger diameter = x hrs Let time taken by tap of smaller diameter = x + 2 hrs A/C to question , $\frac{1}{x} + \frac{1}{x-2} = \frac{12}{35}$ $6x^2 - 23x - 35 = 0$ (6x+7) (x-5) = 0 x = -7/6, 5 Neglecting negative value because time can't be –ve. ∴ x = 5 hrs. Smaller tap can fill the tank in 7 hrs and larger tank in 5 hrs.	4
Ans28	a) Let the cost price of the toy be Rs x. Then gain = x% Gain = Rs $(x \times \frac{x}{100}) = \frac{x^2}{100}$ SP = C.P + gain $24 = x + \frac{x^2}{100}$ $x^2 + 100x - 2400 = 0$ (x-20) (x+120) = 0 x = 20 , -120 C.P of is Rs. 20 b) Quadratic Equation c) Genuine Profit	4

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Test Paper Session 2017-18

CLASS 10 SUBJECT Mathematics Chapter 5 Arithmetic Progression

Ans1.	a-18 = -3-b a+ b = 15	1
Ans2	a=3, d = 1-3=-2, a_5 = 3 + (5-1) (-2) a_5 = -5	1
Ans3	a = -2 , d = -2, a_1 = -2, a_2 = -4, a_3 = 6, a_4 = -8	1
Ans4	4k-6 – k-2 = 3 k-2 – 4k + 6 3k -8 = -k+4 4k = 12 k= 3	1
Ans5	Let n^{th} term of A.P be zero; a_n = 0 a+(n-1) d = 0 120 + (n-1) (-4) = 0 n = 31 ∴ The first negative term will be 31 +1 = 32^{nd} term.	2
Ans6	If a_n = 184, a = 3 , d = 4 a_n = a+ (n-1) d 184 = 3 + (n-1) 4 n = 46.25 Thus 184 is not term of given A.P.	2
Ans7	2x + 1 – x-3 = x – 7 – 2x – 1 x = -3	2
Ans8	Put a_n = 100, a = 25, d= 3 a_n = a+ (n-1) d 100 = 25 + (n-1) d N = 26 ∴ 100 is a term of given A.P	2
Ans9	Let a = 3 , d = 7 a_n = a_{13} + 84 a + (n-1) d = a + 12d + 84 n = 25	2
Ans10	$5a_5 = 8a_8$ 5(a+4d) = 8 (a+7d) a+ 12d = 0 a_{13} = 0	2
Ans11	Let common diff. = d a + d = 10 ; a + 4 d = 31 d = 7 and a = 3 a = 3, b = 17, c = 24	2
Ans12	a_8 = 0 a = -7d a_{38} = a + 37d = -7d + 37d = 30d a_{18} = a+17d = -7d+ 17d = 10d $a_{38} = 3 \times 10d = 3 \times a_{18}$ ∴ $a_{38} = 3a_{18}$	2
Ans13	a = 254, d = -5 a_{10} = a+9d = 254 + 9 (-5) = 209 ∴ 10^{th} term from the back is 209.	3
Ans14	$a_n = S_n - S_{n-1}$ $a_{n-1} = S_{n-1} - S_{n-2}$ $S_n - 2S_{n-1} + S_{n-2} = S_n - S_{n-1} - S_{n-1} + S_{n-2}$ $= (S_n - S_{n-1}) - (S_{n-1} - S_{n-2})$ $= T_n - T_{n-1} = d$	3
Ans15	a = 101, d = 7 , a_n = 997 a_n = a + (n-1) d	3

	997 = 101 + (n-1) 7 n = 129	
Ans16	Let the number of terms be n and a_n be x. a = -4 , d = 3 $x = -4 + (n-1)^3$ $n = \frac{x+7}{3}$ $\frac{(x+7)(x-4)}{6} = 437$ x = 50 or -53 Neglecting –ve values, x = 50	3
Ans17	The series as per question is 102,108,114,------, 198 is an AP 198 = 102 + (n-1) 6 n = 17 $S_n = S_{17} = 17/2\ (102 + 198) = 2550$	3
Ans18	a = 9, d = -3 $S_n = -216$ n/2 [2a+ (n-1)d] = -216 n/2 [2(9) + (n-1) (-3) = -216 $n^2 – 7n – 144 = 0$ n = -9 or 16 ∴ n = 16 neglacting – ve values	3
Ans19	$S_n = 3n^2 – 4n$ $S_1 = -1, S_2 = 4$ $a_1 = S_1 = -1$ $a_2 = S_2 – S_1 = 4 -(-1) = 5$ d = 6 $a_{12} = (-1) + 11x\ 6 = 65$	3
Ans20	a = 12, a_n = 264, d= 4 $n = \frac{a_n - a}{d} + 1 = \frac{264-12}{4} + 1 = 64$ There are 64 ,multiples of 4 that lie between 11 and 266.	3
Ans21	S_4 = 280, d = 20 n = 4 $S_n = \frac{n}{2}$ [2a + (n-1) d] $S_n = \frac{4}{2}$ [2a + 3x 20] = 2 (2a + 60) $\frac{280}{2}$ = 2a + 60 a = 4 0 ∴ four prizes are Rs 40,60,80 and Rs 100	4
Ans22	Let 1st term = a, common diff = d $S_m = S_n$ $\frac{m}{2}$ [2a+ (m-1) d] = $\frac{n}{2}$ [2a + (-1) d] 2a + (m+n-1) d = 0 $S_{m+n} = \frac{m+n}{2}$ [2a + (m+n-1)d] $= \frac{m+n}{2}$x 0 = 0	4
Ans23	a = 20, d = 15, S = 3250 $S_n = \frac{n}{2}$ [2a + (n-1) d] $3250 = \frac{n}{2}$ [2a + (n-1) 15] n = -65, 20 ∴ Man will repay loan after 20 months.	4
Ans24	a + 2d = 11 (1) a+9d = 2 (a+4d) + 1 -a + d = 1 (2) Solving (1) and (2) a = 3, d = 4 $S_3 = \frac{30}{2}$ [6+2a x 4] = 1830	4
Ans25	$a_3 + a_7 = 6$; a_3 x a_7 = 8	4

	$2a + 8d = 6$; $(a+2d)(a+6d) = 8$ $a + 4d = 3$ = $a = 3-4d$ $(3-4d + 2d)(3-4d + 6d) = 8$ $(3+2d)(3-2d) = 8$ $9-4d^2 = 8$ $d = -\frac{1}{2}, \frac{1}{2}$ If $d = \frac{1}{2}$; $a = 1$ and $S_{20} = 115$ If $d = -\frac{1}{2}$; $a = 5$ and $S_{20} = 5$	
Ans26	$n = 21$ Middle most term = $\frac{21+1}{2} = 11^{th}$ 3 middle most terms are 10^{th}, 11^{th}, 12^{th} $a_{10} + a_{11} + a_{12} = 129$ $a+9d + a+ 10d + a + 11d = 129$ $a + 10d = 43$ (1) $a_{19}+ a_{20} + a_{21} = 237$ $a+ 18d + a+19d + a+20d = 237$ $a+ 19d = 79$ on solving (1) and (2), $9d = 36$ $d = 4$ $a = 43 – 40 = 3$	4
Ans27	Let r_1, r_2 ---- be the radii of semicircles and L_1, L_2 ----- be the length of circumferences of semicircles, then $L_1 = \pi r_1 = \pi (1) = \pi$ cm $L_2 = \pi r_2 = \pi (2) = 2\pi\ cm$ $L_3 = 3\pi$ and -----------$L_{11} = 11\ \pi cm$ Total length of the spiral = $L_1 + L_2 + - - - - + L_{11} = \pi\left(\frac{11x12}{2}\right)$ = 207.24cm.	4
Ans28	$S_1 = \frac{n}{2}[2a + (n-1)d]$ $S_2 = \frac{2n}{2}[2a + (2n-1)d]$ $S_3 = \frac{3n}{2}[2a + (3n-1)d]$ $3(S_2 – S_1) = 3[\frac{2n}{2}\{2a + (2n-1)d\} - \frac{n}{2}\{2a + (n-1)d\}]$ $= 3[\frac{n}{2}(2a + 3nd-d)]$ $=\frac{3n}{2}[2a+ (3n-1)d]$ $= S_3$	4

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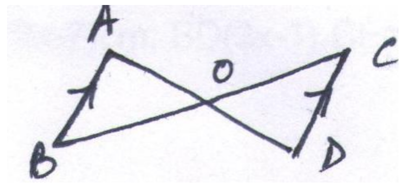
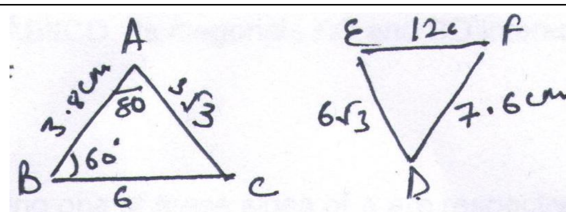
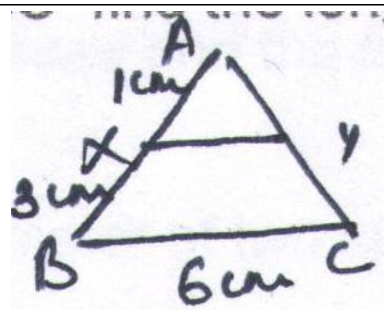
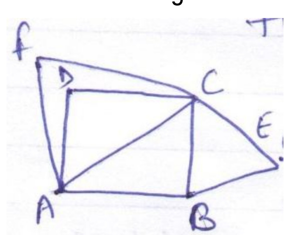
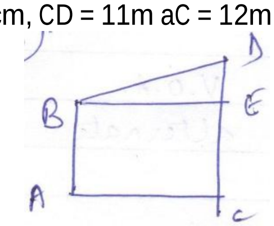
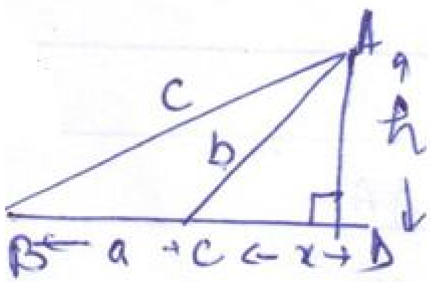
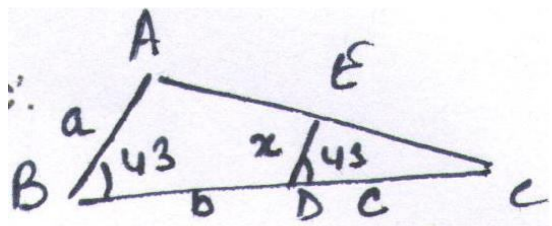
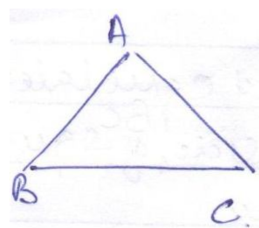
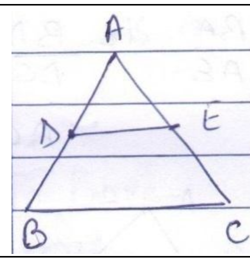
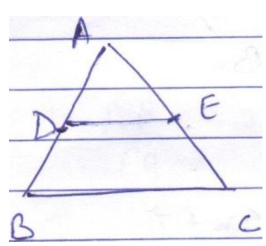
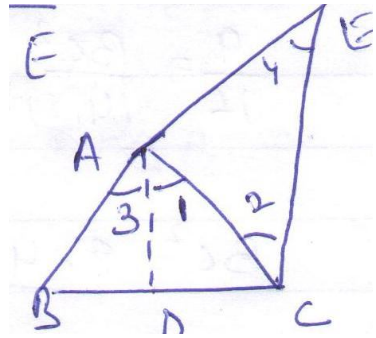
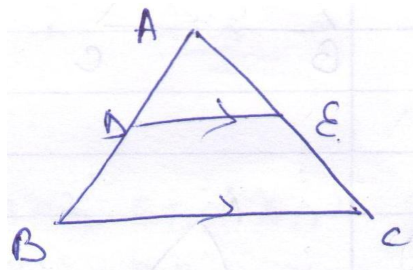
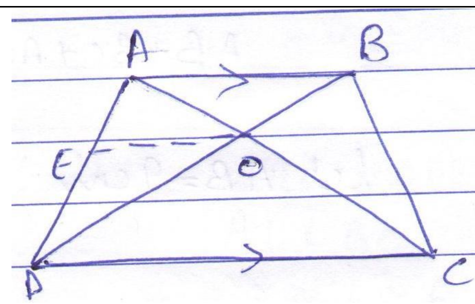
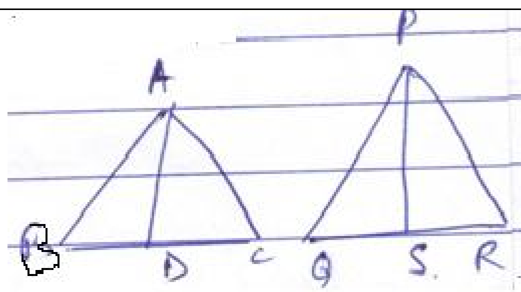
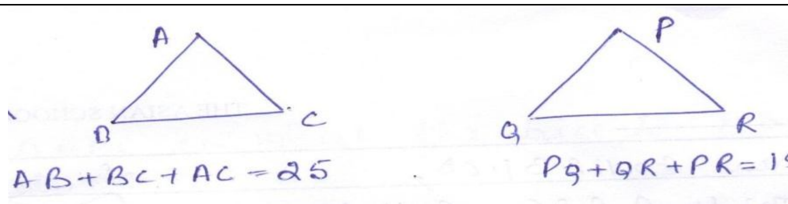
Test Paper Session 2017-18

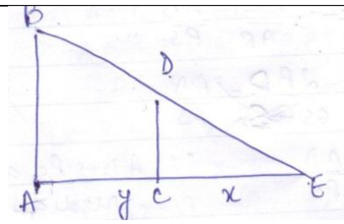
CLASS 10 SUBJECT Mathematics CHAPTER- 6 Triangles

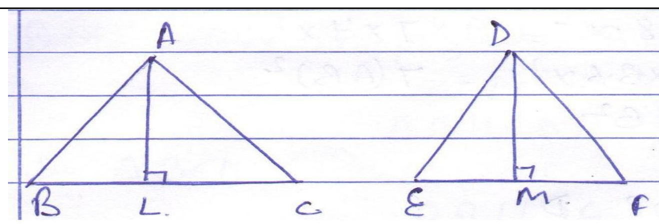
Ans	$25^2 = 24^2 + 7^2$ = 625 = 576+49 ∴ the given Δ form a right Δ form a right Δ	1
Q2.	<AOB = <COD (V.O.A) <BAD = <CDA (alternate) ∴ Δ A OB ~ ΔDOC (A A)  	1
Q3.	$\frac{AB}{DF} = \frac{BC}{EF} = \frac{AC}{ED}$ ΔABC~ ΔDFE S.S.S <F = <B = 60^0  	1
Q4.	XYIIBC Δ AXY ~ Δ ABC AA ∴ <A = <A common <AXY = <ABC corresponding $\frac{AX}{AB} = \frac{XY}{BC} = \frac{AY}{AC}$ $\frac{1}{1+3} = \frac{XY}{6}$ XY = $\frac{6}{4} = \frac{3}{2}$ = 1.5cm  	1
Ans5	Given A square ABCD and equilateral ΔBCE and ΔACF on one side BC of square and diagonal aC respectively. To Prove : or ΔBCE = $\frac{1}{2}$as ΔACF Since each of Δ BCE and ΔACF is an equilateral Δ so each angle of each of them is 60^0 Hence Δ BCE ~ Δ ACF $\frac{Ar\ \Delta BCE}{ar\ \Delta ACF} = \frac{BC^2}{AC^2} = \frac{BC^2}{2(BC)^2} = \frac{1}{2}$ ar Δ BCE = ½ ar Δ ACF  	2
Ans6	Let AB and CD given vertically poles. Then AB = 6 cm, CD = 11m aC = 12m Draw BEIIAC then CE = AB = 6m, BE = AC = 12m DE = CD-CE = 11m - 6m = 5m Δ BED $BD^2 = BE^2 + DE^2 = 12^2+5^2$ = 144+25 BD = 13m  	2

Ans7	In $\Delta ABD = AB^2 = BD^2 + AD^2$ $C^2 = (a+x)^2 + h^2$ $C^2 = a^2 + 2ax + x^2 + h^2$ $C^2 = a^2 + 2ax + h^2$ Therefore : $h^2 + x^2 = b^2$ 	2
Ans8	$\Delta CBA \quad \Delta CDE$ $\frac{c}{b+c} = \frac{x}{a}$ x = $\frac{ac}{b+c}$ 	2
Ans9	$AB^2 = AC^2 + AC^2$ $AB^2 = AC^2 + BC^2$ By converse of Pythagoras theorem Δ is right Δ. 	2
Ans10	Given Δ ABC ~ ΔDEF $\frac{ar\ \Delta ABC}{ar\ \Delta DEF} = \frac{BC^2}{EF^2}$ $\frac{9}{10} = \frac{BC^2}{EF^2}$ $\qquad$ $\frac{9}{16} = \frac{BC^2}{(4.2)^2}$ $BC^2 = \frac{9x4.2x4.2}{16}$ BC = $\frac{3x4.2}{4} = \frac{12.6}{4}$ = 3.15cm	2
Ans11	∴ DE II BC <A is common <ADE = <ABC corresponding Δ ADE~ ΔABC by AA 	2
Ans12	AB = 12 cm, AD = 8 cm AE = 12 cm, AC = 18 cm $\frac{AD}{AB} = \frac{AE}{AC}$ $\frac{8}{12} = \frac{12}{18} \rightarrow \frac{2}{3} = \frac{2}{3}$ $\frac{AD}{A\ B} = \frac{AE}{AC}$ By converse of BPT, DE II BC 	2
Ans13	Given ΔABC in which the bisector AD of <A meets BC in D. To Prove $\frac{BD}{DC} = \frac{AB}{AC}$	3

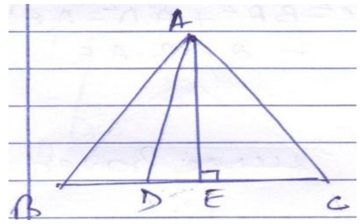
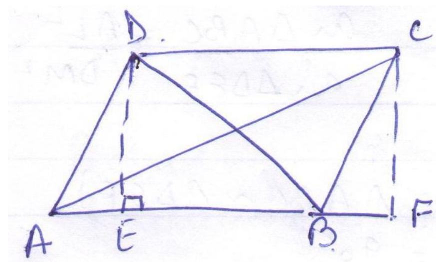
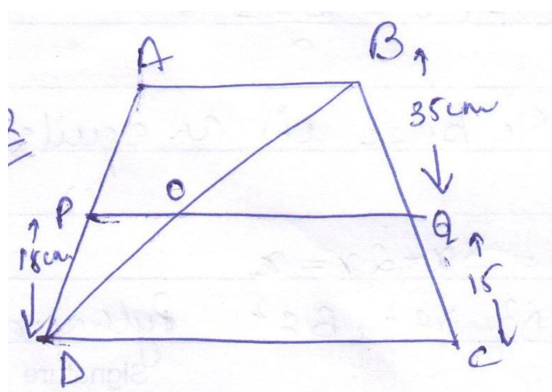
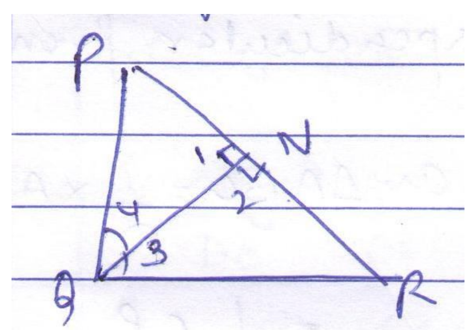
	Construction : Draw CE II DA meeting BA produced in E. Proof CE II DA <1 = <2 alternate app <3 = <4 corresponding < But <1 = <3 given <2 = <4 AE = AC ∴ CE II DA $\frac{BD}{DC} = \frac{BA}{AE}$ ie. $\frac{BD}{DC} = \frac{AB}{AC}$ ∴ AC = AE 	
Ans14	In Δ ABC, DEII BC $\frac{AD}{BD} = \frac{AE}{CE}$ (BPT) $\frac{4x-3}{3x-1} = \frac{8x-7}{5x-3}$ (4x-3) (5x-3) = (8x-7) (3x-1) $20x^2 - 27x + 9 = 24x^2 - 29x+7$ $4x^2 - 2x- 2= 0$ $2x^2 - x-1 = 0$ $2x^2 - 2x + x-1 = 0$ 2x(x-1) + 1 (x-1) = 0 (2x+1) (x-1) = 0 X = 1 , x = -1/2 AD = [4 (-1/2) - 3] = -5 Not Applicable. x = 1 Ans 	3
Ans15	Draw EO II AB II CD Now in Δ ADC EO II DC $\frac{AE}{ED} = \frac{AO}{OC}$ (BPT) In Δ BD EO II AB $\frac{AE}{ED} = \frac{BO}{OD}$ From 1 and 2 $\frac{AO}{OC} = \frac{BO}{OD}$ 	3
Ans16	 Given Δ ABC and ΔPQR in which AD ad PS are te medians such that $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PS}$ To Prove ΔABC~ ΔPQR Proof since $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PS}$ $\frac{AB}{PQ} = \frac{2BD}{2QS} = \frac{AD}{PS}$ ∴ AD and PS are median $\frac{AB}{PQ} = \frac{BD}{QS} = \frac{AD}{PS}$ Δ ABC ~ ΔPQS (SSS) <B= <Q (Corresponding angles of similar Δ) Now in ΔABC and ΔPQR $\frac{AB}{PQ} = \frac{BC}{QR}$ < B= <Q	3

<table>
<tr><td></td><td>ΔABC ~ ΔPQR</td><td></td></tr>
<tr><td>Ans17</td><td>

Let AB = 9 cm since ΔABC ~ ΔPQR
$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$ = K let
AB = kPQ, BC = k QR, AC = KPR
Perimeter of Δ ABC = $\frac{AB+BC+AC}{PQ+QR+PR} = \frac{K\ (PQ+QR+PR}{PQ+QR+PR}$
$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{Perimeter\ of\ \Delta ABC}{Perimeter\ of\ \Delta PQR}$
$\frac{9}{PQ} = \frac{25}{15}$ = PQ = $\frac{9x15}{25}$ = 5.4
Ans 5.4 cm.</td><td>3</td></tr>
<tr><td>Ans18</td><td>

Let AB = 3.3m be the lamp post, CD = 1.1 m be the position of boy after 4 seconds. Also let shadow of boy after 4 sec = xm distance travelled by boy in 4 sec = y = 0.8 x 4 = 3.2 m
ΔAEB ~ ΔCED, < EAB = < ECD = 90^0 < E = <E common
$\frac{AE}{EC} = \frac{AB}{CD}$
$\frac{x=y}{x}\ \frac{3.3}{1.1}$
x + y = 3x y = 2x
x = $\frac{y}{2} = \frac{3.2}{2}$ = 1.6
Ans 1.6m</td><td>3</td></tr>
<tr><td>Ans19</td><td>

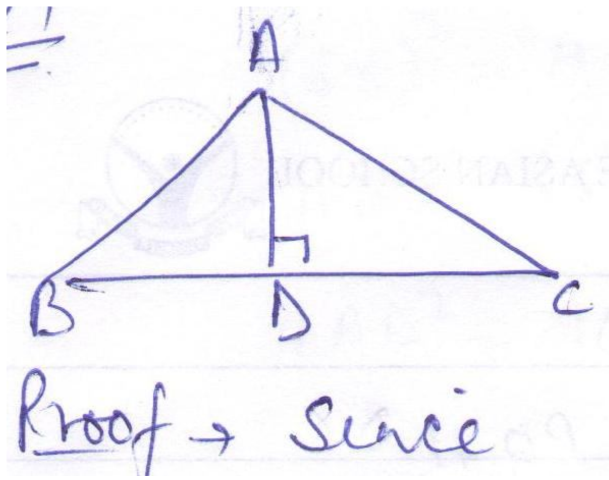
Given ΔABC ~ ΔDEF
AL ⊥ BC, DM⊥EF
To prove
$\frac{\Delta ABC}{\Delta DEF} = \frac{AL^2}{DM^2}$
Prove : In ΔALB and ΔDME
<B = <E (as Δ ABC ~ ΔDEF)
<ALB = <DME = 90^0
ΔABL ~ Δ DEM (AA) Similarity
$\frac{AB}{DE} = \frac{AL}{DM}$
$\frac{ar\Delta ABC}{ar\Delta DEF} = \frac{AL^2}{DM^2}$
∴ ratio of reas of two similar Δ's is equial to ratio of squraes of the corresponding sides
$\frac{\Delta ABC}{\Delta DEF} = \frac{AL^2}{DM^2}$</td><td>3</td></tr>
</table>

Ans20	Let AB = AC = BC = 6x BD = 1/3 BC = $\frac{1}{3}$ 6x = 2x BE = EC = BC/2 = 3x (Perpendicular bisects the base in an equilaten Δ) DE= BE – BD = 3x – 2x = x $AB^2 = AE^2 + BE^2 = AD^2 - DE^2 + BE^2$ Pythagoras theorem $(6x)^2 = AD^2 - x^2 + (3x)^2$ $AD^2 = 36x^2 + x^2 - 9x^2 = 28x^2$ $9AD^2 = 9(28)x^2 = 9x7x4x^2$ $= 7(36)x^2 = 7(AB)^2$ $9AD^2 = 7AB^2$ 	3
Ans21	Draw DE ⊥AB CF ⊥AB produced ΔAED and ΔBFC AD = BC $<DEF = <CFB$ each 90^0 DE = CF ∴ perpendicular distance between two parallel lines ΔAED ~ ΔBFC (RHS) AE = BF LHS $AC^2 + BD^2 = (AF^2 + CF^2) + (DE^2 + BE^2)$ $(AB+ BF)^2 + (BC^2 – BF^2) + AD^2 – AE^2 + (AB- AE)^2$ $AB^2 + BF^2 + 2AB.BF + BC^2 – BF^2 + AD^2 – AE^2 + (AB – AE)^2$ AB^2 + BFx + 2AB BF + $BC^2 – BF^2 + AD^2 – AE^2 + AB^2 + AE^2$ – 2AB. AE AE = BF, AB = CD $AC^2 + BD^2 = AB^2 + BC^2 + CD^2 + DA^2$ Hence Proved 	4
Ans22	Given : ABCD is trapezium AB II CD and PQII DC PD = 18 cm, BQ = 35 cm QC = 15 cm To find AD Proof In trapezum ABCD AB II CD, PQ II DC AB II CD II PQ In ΔBCD OQ II DC $\frac{BO}{OD} = \frac{BQ}{QC}$ (BPT) In ΔDAB, POIIAB $\frac{BO}{OD} = \frac{AP}{PD}$ (BPT) $\frac{AP}{PD} = \frac{BQ}{QC}$ $\frac{AP}{18} = \frac{35}{15}$ AP = $\frac{35}{15}$X 18 = 7X6 = 42 cm AD = AP+PD = 42 + 18 = 60 cm 	4
Ans23	Given Δ PQR in which Q N ⊥ PR and PNxNR = QN^2 To prove $<PQR = 90^0$ Poof in Δ QNP and ΔQNR QN⊥ PR $<2 = <1 = 90^0$ QN^2 = NR X NP $\frac{QN}{NR} = \frac{NP}{QN} \rightarrow \frac{QN}{NP} = \frac{NR}{QN}$ ΔQNR ~ ΔPNQ SAS $<3 = <P$, $<2 = <1 = 90^0$ $<R = <4$ IN Δ PQR $<P + PQR + <R = 180$ $< 3 + 4 + <3 + <4 = 180$ 	4

2(<3+4) = 180
<3 + <4 = 90^0 < PQR = 90^0

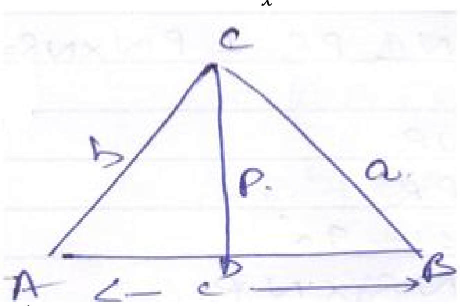
Ans24 (4)

Given Δ ABC in which AD DB = 3CD
To Prove $2AB^2 = 2AC^2 + BC^2$
Proof : Since DB = 3CD $\frac{DB}{CD} = \frac{3}{1}$
DB = 3x CD = x
$\frac{DB}{BC} = \frac{3x}{4x} = \frac{3}{4}$ DB = $\frac{3}{4}$ BC
$\frac{DC}{BC} = \frac{x}{4x} = \frac{1}{4}$ DC = $\frac{1}{4}$BC
By Pythagoras theorem
$AB^2 = AD^2 + BD^2$
$= AC^2 – DC^2 + BD^2$
$AC^2 - \frac{1}{16} BC^2 + \frac{9}{16} BC^2$
$AC^2 + \frac{8}{16} BC^2$
$AC^2 + \frac{1}{2} BC^2$
$2AB^2 = 2AC^2 + BC^2$



Ans25 (4)

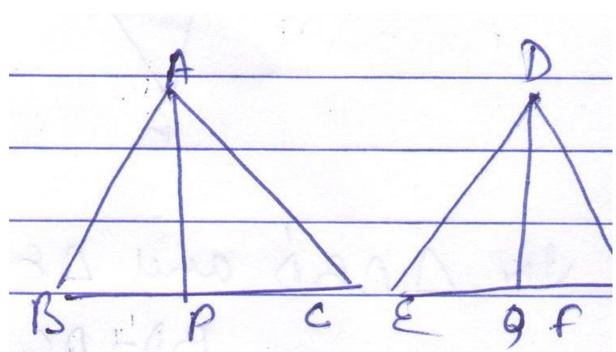
Given : ABC is right Δ , right angled at C, p is the length of perpendicular from C to AB
Proopf : a) an ΔABC = $\frac{1}{x}$X AB X CD



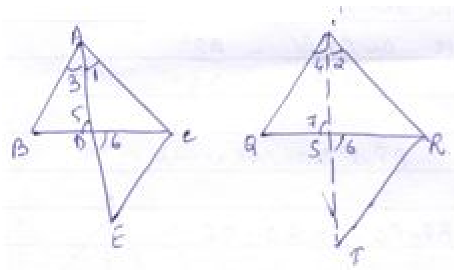
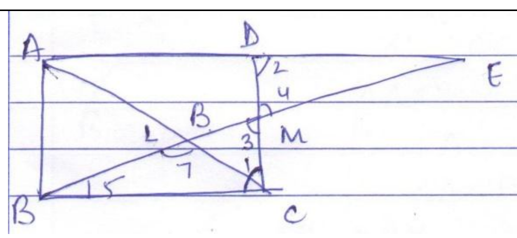
$= \frac{1}{2}$ cp
also as Δ aBC = $\frac{1}{2}$ AC X BC
$= \frac{1}{2}$ ba
$\frac{1}{2}$ cp = $\frac{1}{2}$ ba ⟶ pc = ab
$c = \frac{ab}{P}$
In Δ ABC
$c^2 = a^2 + b^2$
$\left(\frac{ab}{P}\right) = a^2 + b^2$
$\frac{1}{P^2} = \frac{a^2+b^2}{a^2b^2} = \frac{a^2}{a^2b^2} + \frac{b^2}{a^2b^2}$
$\frac{1}{P^2} = \frac{1}{b^2} + \frac{1}{a^2}$

Ans26 (4)

Given Δ ABC~ ΔDEF, AP and DQ are the medians of ΔABC and ΔDEF respectively.
To prove $\frac{ar\ \Delta ABC}{ar\ \Delta DEF} = \frac{AP^2}{DQ^2}$
Proof : AP and DQ are medians
∴ BP = PC and EQ = QF
Given Δ ABC~ Δ DEF
$= \frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$ < A = <D, <B = <E
< C = <F
$\frac{AB}{DE} = \frac{BC}{EF}$ ⟶ $\frac{AB}{DE} = \frac{2BP}{2EQ} = \frac{BP}{EQ}$
<B = <E
Δ ABP ~ ΔDEQ SAS
$\frac{\Delta ABC}{\Delta DEF} = \frac{AB^2}{DE^2}$



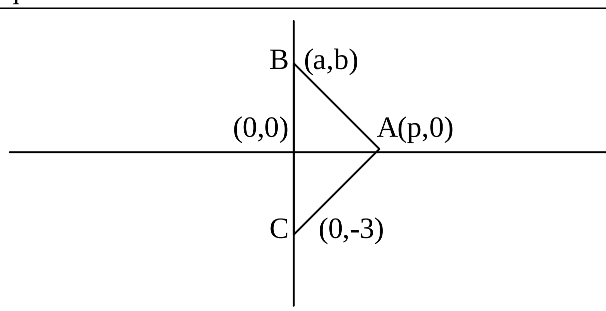
∴ the ratio of areas of two similar Δs is ratio of squares of their corresponding side from 1 and 2

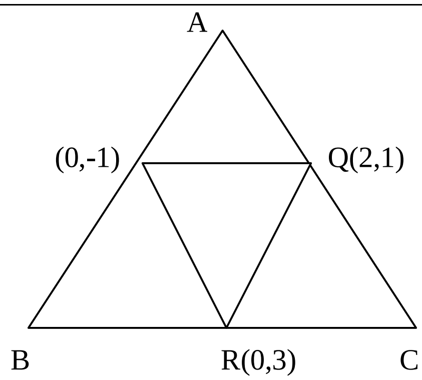
	$\frac{ar\Delta ABC}{ar\Delta DEF} = \frac{AP^2}{DQ^2}$	
Ans27	Given : Δ ABC and ΔPQR in which AD and PS are the medians such that $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{AD}{PS}$ To prove : ΔABC~ ΔPQR Construction : Produce AD to E such that AD = DE join EC. Also produce PS to T such that PS = ST joint TR  In Δ ABC and ΔECD we have BD = DC (D is mid point of BC as AD is median) <5 = <6 AD= DE construction Δ ABD≅ ΔECD ⟶ AB = EC (Cpct) (i) Similarily ΔPQS ≅ Δ TRS PQ = TR Since $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{AD}{PS}$ (ii) $\frac{EC}{TR} = \frac{AC}{PR} = \frac{2AD}{2PS}$ $\frac{EC}{TR} = \frac{AC}{PR} = \frac{AE}{PT}$ Δ AEC ~ ΔPTR < 1 = <2 (Corresponding angle of similar Δ are equal) Similarily <3 = <4 <1 + <3 = <2 + <4 <A = <P Now in Δ ABC and ΔPQR $\frac{AB}{PQ} = \frac{AC}{PR}$ <A = <P ΔABC ~ ΔPQR (SAS)	4
Ans28	 In Δs BMC and DME <1 = 2 alternate is as BCII DE CM = DM ∴ M is mid point of DC) <3 = <4 (V.O.A) ΔBMC ≅ ΔEMB ASA BC = ED BC = AD 2BC = DE + AD = AE $\frac{BC}{AE} = \frac{1}{2}$ Now in Δ BCL and ΔEAL	4

	<5 = <6 alernate <7 = <8 Δ BCL ~ Δ EAL $\frac{BC}{EA} = \frac{BL}{EL}$ $\frac{1}{2} = \frac{BL}{EL} \longrightarrow$ EL = 2BL	

THE ASIAN SCHOOL, DEHRADUN
Test Paper Session 2017-18
CLASS 10SUBJECT: Mathematics CHAPTER- 7 Coordinate Geometry

Ans1	(K, 2K) (3K , 3K) (3,1) K(3k -1) + 3K (1-2K) + 3(2K-3K) =0 On solving K = -1/3	1
Ans2	-1	1
Ans3	0	1
Ans4	C	1
Ans5	$x = \frac{3+14}{3} = \frac{17}{3}$ Ans: quadrant IV $y = \frac{4-12}{3} = \frac{-8}{3}$	2
Ans6	(0,-1)	2
Ans7	$\frac{a}{3} = \frac{-2-6}{2}$ a = -12	2
Ans8	(8,1) (k,-4) (2,-5) 8 (-4+5) + k (-5-1) + 2 (1+4) = 0 8 – 6 k + 10 = 0 K = 3	2
Ans9	Let ratio be k: 1 $\frac{-2}{7} = \frac{2k-2}{k+1}$ -2 k -2 = 14 k – 14 12 = 16k k = 3:4	2
Ans10	$x = \frac{1-2}{1+2} = \frac{-1}{3}$ Point (-1/3,0)	2
Ans11	Let A=(1,2), B=(1,0),C=(4,0),D=(a,b) M.P. of AC = $\left(\frac{1+4}{2}, \frac{2+0}{2}\right)$ M.P. of BD = $\left(\frac{a+1}{2}, \frac{b+0}{2}\right)$ ∴on comparing a = 5 ; b = 2 Point D (5,2)	2
Ans12	Same as answer 12	2
Ans13	Let ratio be K : 1 $0 = \frac{3k-2}{k+1}$ ∴ K = 2/3 Ratio = 2:3	
Ans14	P ------------------------Q (x,2x) $\sqrt{10}$ (2,3) PQ = $\sqrt{10}$ $\sqrt{(x-2)^7 + (2x-3)^2} = \sqrt{10}$ Squaring and solving $5x^2 - 16x + 3 = 0$ (5x – 1) (x-3) = 0 x = 1/5 ; x = 3	
Ans16	P = (2,5) Q = (x, -3) R = (7,9) PQ = QR $\sqrt{(x-2)^2 + (-3-5)^2} = \sqrt{(7-x)^2 + (9+3)^2}$ Squaring both sides and solving ; 10x = 49 + 144 – 4 – 64 10x = 125 x = 25/2	
Ans17	Let point P is equidistant from A(3,2) and B (3,-2)	

	$\sqrt{(x-3)^2+(y-2)^2} = \sqrt{(x-2)^2+(y+3)^2}$ $x^2 + 9 - 6x + y^2 + 4 - 4y = x^2 + 4 - 4x + y^2 + 9 + 6y$ on simplifying $x + 5y = 0$	
Ans18	A K P 1 B (-3,5) (2,-5/6) (3,-2) By section F $2 = \frac{3k-3}{k+1}$ 5 = k K = 5/1: Ratio is 5 : 1	
Ans19	Area is zero: hence ½ [2 (k – 10) + 5 (10-4) + 3 (4- k) = 15 2 k – 10 + 30+ 12 – 3k = 30 - k = 30 – 30 + 8 K = - 8	
Ans20	Let point P(x,y) is equidistant from A(3,2) and B (3,-2) implies PA=PB $\sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x-3)^2+(y-4)^2}$ $x^2 + 9 - 6x + y^2 + 36 - 12y = x^2 + 9 + 6x + y^2 + 16 - 8y$ -12x – 4y = 25 – 45 - 12x – 4y =-20 3x + y = 5	
Ans21	Let ratio be K: 1 A K P 1 B (-3,1) (-6,9) (-8,9) $-6 = \frac{-8k-3}{k+1}$ 6 k + 6 = 8 k + 3 K = 3/2 Ratio = 3: 2 $a = \frac{9k+1}{k+1}$ implies $a = \frac{\frac{27}{2}+1}{\frac{3}{2}+1} = \frac{29}{5}$	
Ans22	1 (7-1) – 4 (1-2) + k (2-7) = 0 6 + 4 – 5k = 0 K = 2	
Ans23	Let ratio be K : 1 A K 1 B (1,3) (x,y) (2,7) $x = \frac{2k+1}{K+1}$ $y = \frac{7k+3}{K+1}$ 3 x + y – 9 = 0 $3\left(\frac{2K+1}{K+1}\right) + \left(\frac{7K+3}{K+1}\right) - 9 = 0$ 6 k + 3 + 7 K + 3 – 9 – 9 k = 0 4k = 9 – 3 – 3 4 k = 3 $K = \frac{3}{4}$ Ratio = 3 : 4	
Ans24	Similar to question no. 20	
Ans25		

	By MPF $0 = \frac{a+0}{2}$, $0 = \frac{b-3}{2}$ a = 0 ; b = 3 point B (0,3) BC = 6 AB = 6 $\sqrt{(P-0)^2 + (0-3)^2} = 6$ $P^2 + 9 = 36$ $P = 3\sqrt{3}$ Point : A ($3\sqrt{3}$,0)	
Ans26	 Area of ΔPQR = ½ [0 (1-3) + 2 (3+1) + 0 (-1-1)] = ½ (-2+8) = 3 Area of Δ ABC = 4 x area of PQR = 4 x 3 = 12 sq. units	

THE ASIAN SCHOOL, DEHRADUN

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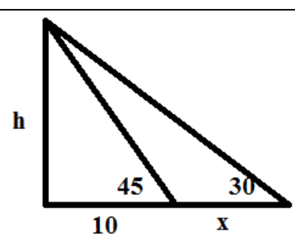
CLASS 10 SUBJECT Mathematics CHAPTER- 8 & 9

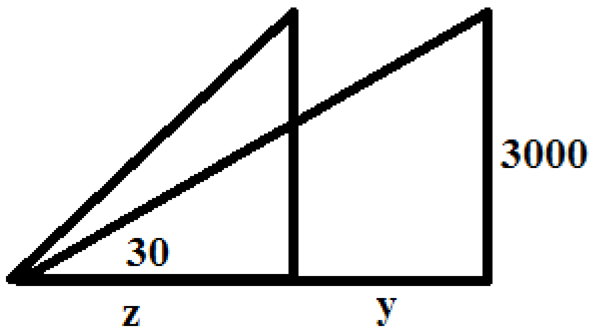
Ans1	$\frac{\tan A + \tan B}{\cot A + \cot B}$ $= \frac{\tan A + \tan B}{\frac{⊥}{\tan A} + \frac{⊥}{\tan B}}$ $= \frac{\tan A + \tan B}{(\tan B + \tan A)} \tan A \tan B$ $= \tan A \tan B$	1
Ans2	$\frac{\tan A + \sec A - 1}{\tan B + \sec A + 1}$ $= \frac{\tan A + \sec A - (\sec^2 A - \tan^2 A)}{\tan A - \sec A + 1}$ $= \frac{(\sec A + \tan A)[1 - \sec A + \tan A]}{(\tan A - \sec A + 1)}$ $= \frac{1}{\cos A} + \frac{\sin A}{\cos A}$ $= \frac{1+\sin A}{\cos A}$	1
Ans3	$\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\cot A}$ $\frac{\frac{\sin A}{\cos A}}{1-\frac{\cos A}{\sin A}} + \frac{\frac{\cos A}{\sin A}}{1-\frac{\sin A}{\cos A}}$ $\frac{\frac{\sin A}{\cos A}}{\frac{\sin A-\cos A}{\sin A}} + \frac{\frac{\cos A}{\sin A}}{\frac{\cos A-\sin A}{\cos A}}$ $= \frac{\sin^2 A}{\cos A(\sin A-\cos A)} + \frac{\cos^2 A}{\sin A(\cos A-\sin A)}$ $= \frac{\sin^2 A}{\cos A(\sin A-\cos A)} - \frac{\cos^2 A}{\sin A(\sin A-\cos A)}$ $\frac{\sin^3 A-\cos^3 A}{\cos A \sin A(\sin A-\cos A)}$ $\frac{(\sin A-\cos A)(\sin^2 A+\sin^2 A+\sin A\cos A)}{\cos A \sin A(\sin A-\cos A)}$ $= \frac{1+\sin A\cos A}{\cos A\sin A}$ = Sec A cosec A + 1 $= \frac{\sin^2 A}{\cos A\sin A} + \frac{\cos^2 A}{\cos A\sin A} + \frac{\sin A\cos A}{\sin A\cos A}$ = tan A + cotA + 1	1
Ans4	(1+ cotA – cosecA) (1+tan A + SecA) 1 + tan A + Sec A + cot A+ cot A tan A + cot A sec A- cosec A – cosec A tan A – cosec A sec A $1 + \frac{\sin A}{\cos A} + \frac{1}{\cos A} + \frac{\cos A}{\sin A} + 1 + \frac{\cos A}{\sin A} \times \frac{1}{\sin A} - \frac{1}{\sin A} \times \frac{\sin A}{\cos A} - \frac{1}{\sin A} \times \frac{1}{\cos A}$ $2 + \frac{\sin A}{\cos A} + \frac{\cos A}{\sin A} - \frac{1}{\sin A\cos A}$ $2 + \frac{\sin^2 A+\cos^2 A-1}{\sin A\cos A}$ $=2 + \frac{1-1}{\sin A\cos A}$ 2 + 0 = 2	1

Ans5	$\tan^2 A + \cot^2 A + 2$ $\sec^2 A - 1 + \csc^2 A - 1 + 2$ $\sec^2 A + \csc^2 A$ $= \frac{1}{\cos^2 A} + \frac{1}{\sin^2 A}$ $= \frac{\sin^2 A + \cos^2 A}{\sin^2 A \cos^2 A}$ $= \frac{1}{\sin^2 A \cos^2 A}$ $= \csc^2 A \sec^2 A$	2
Ans6	$\frac{(\sec A - \tan A)^2 + 1}{\csc A\,(\sec A - \tan A)}$ $\frac{\sec^2 A + \tan^2 A - 2\sec A \tan A + 1}{\csc A\,(\sec A - \tan A)}$ $= \frac{2\sec^2 A - 2\sec A \tan A}{\csc A\,(\sec A - \tan A)}$ $= \frac{2\sec A\,(\sec A - \tan A)}{\csc A\,(\sec A - \tan A)}$ $= 2\tan A$	
Ans7	$\frac{\sin A - \sin B}{\cos A + \cos B} + \frac{\cos A - \cos B}{\sin A + \sin B}$ $\frac{\sin^2 A - \sin^2 B + \cos^2 A - \cos^2 B}{(\cos A + \cos B)\,(\sin A + \sin B)}$ $\frac{1-1}{(\cos A + \cos B)(\sin A + \sin B)}$ $= 0$	
Ans8	$(\cos A + \sec A)^2 + (\sin A + \csc A)^2$ $\cos^2 A + \sec^2 A + 2\sec A \cos A + \sin^2 A + \csc^2 A + 2\sin A \csc A$ $1 + 2 + 2 + \sec^2 A + \csc 2A$ $5 + \tan^2 A + 1 + \cot^2 A + 1$ $7 + \tan^2 A + \cot^2 A$	
Ans9	$\frac{\cot A}{\csc A + 1} + \frac{\csc A + 1}{\cot A}$ $\frac{\cot^2 A + \csc^2 A + 1 + 2\csc A}{\cot A\,(\csc A + 1)}$ $\frac{2\csc^2 A + 2\csc A}{\cot A\,(\csc A + 1)}$ $\frac{2\csc A\,(\csc A + 1)}{\cot A\,(\csc A + 1)}$ $= 2\sec A$	
Ans10	$(\sin A + \sec A)^2 + (\cos A + \csc A)^2$ $\sin^2 A + \sec^2 A + 2\sin A \sec A + \cos^2 A + \csc^2 A + 2\cos A \csc A$ $1 + \sec^2 A + 2\tan A + \csc^2 A + 2\cot A$ $1 + \frac{1}{\cos^2 A} + \frac{1}{\sin^2 A} + \frac{2\sin A}{\cos A} + \frac{2\cos A}{\sin A}$ $1 + \frac{\sin^2 A + \cos^2 A}{\sin^2 A \cos^2 A} + \frac{2\sin^2 + 2\cos^2 A}{\sin A \cos A}$ $1 + \frac{1}{\sin^2 A \cos^2 A} + \frac{2}{\sin A \cos A}$ $1 + (\sec A \csc A)^2 + 2\sec A \csc A$ $(1 + \sec A \csc A)^2$	
Ans11	$\frac{\sin A}{1 - \cos A} + \frac{\tan A}{1 + \cos A}$ $\frac{\sin A}{1 - \cos A} + \frac{\sin A}{\cos A(1 + \cos A)}$ $\frac{\sin A \cos A(1 + \cos A) + \sin A(1 - \cos A)}{(1 - \cos A)(1 + \cos A)\cos A}$ $\frac{\sin A \cos A + \sin A \cos^2 A + \sin A - \sin A \cos A}{(1 - \cos A)(1 + \cos A)\cos A}$ $\frac{\sin A(1 + \cos^2 A)}{\sin^2 A \cos A}$ $\frac{1 + \cos^2 A}{\sin A \cos A}$	

	$\frac{1}{sinA\ cosA} + \frac{cos^2A}{sinA\ cosA}$ Sec A cosecA + cotA	
Ans12	(cosecA- SinA) (secA – cosA) $\left(\frac{1}{SinA} - sinA\right)\left(\frac{1}{cosA} - cosA\right)$ $\frac{1-sin^2A}{SinA}$ x $\frac{1-cos^2A}{cosA}$ $\frac{cos^2A}{SinA}$ X $\frac{sin^2A}{cosA}$ Sin A cos A RHS : $\frac{1}{tanA + cotA}$ $\frac{1}{\frac{sinA}{cosA}+\frac{cosA}{sinA}}$ = $\frac{sinAcosA}{Sin^2A + cos^2A}$ = sin A cos A	

Ans13	$\frac{cot58}{tan32} + \frac{cos59}{sin31}$ + $sin^2 50$ + $sin^2 40$ – 8 $Sin^2 30$ $\frac{\cot(90-32)}{tan32} + \frac{cos(90-31)}{sin31}$ + sin^2 (90-40) + $sin^2 40$ – 8 x $(1/2)^2$ $\frac{tan32}{tan32} + \frac{sin31}{sin31}$ + $cos^2 40$ + $sin^2 40$ – 2 = 1+1+1 - 2 = 1	
Ans14	$Sec^2 32$ – $cot^2 58$ + $\frac{cot15}{tan75} - \frac{cos27}{sin63}$ + 2 $sin^2 45$ $Sec^2(90-58)$ – $cot^2 58$ + $\frac{\cot(90-75)}{tan75} - \frac{\cos(90-63)}{sin63}$ + 2 x $\left(1/\sqrt{2}\right)^2$ $Cosec^2 58$ – $cot^2 58$ + $\frac{tan75}{tan75} - \frac{sin63}{sin63}$ + 1 = 1+1-1+1 = 2	
Ans15	$\frac{sin40}{cos50} + \frac{sec^2 35}{cosec^2 55}$ + tan20 tan40 tan45 tan50 tan70 $\frac{\sin(90-50)}{cos50} + \frac{sec^2(90-55)}{cosec^2 55}$ + tan (90-70) tan (90-50). 1. tan50 tan 70 $\frac{cos50}{cos50} + \frac{cosec^2 55}{cosec^2 55}$ + cot70 cot50 tan50 tan 70 1+1+1 = 3	
Ans16	$Sin^2 65$+$Sin^2 22$+ tan10 tan25 tan60tan65 tan80+ $\frac{sin70}{cos20} + \frac{sec^2 65}{cosec^2 25}$ $Sin^2(90-22)$ + $sin^2 22$+ + tan (90-80) tan (90-65) $\sqrt{3}$ tan65 tan80+ $\frac{\sin(90-20)}{cos20} + \frac{sec^2(90-25)}{cosec^2 25}$ $Cos^2 22$+ $sin^2 22$+ cot80cot65. $\sqrt{3}$. Tan65 tan80+ $\frac{cos20}{cos20} + \frac{cosec^2 25}{cosec^2 25}$ = 1 + $\sqrt{3}$ + 1 + 1 = 3 + $\sqrt{3}$	
Ans17	a) Cos(20+x) = sin 60 Cos(20+x) = cos30 20 + x = 30 x = 10 b) 2 sin (3x-15) = $\sqrt{3}$ Sin(3x-15) = $\frac{\sqrt{3}}{2}$ Sin(3x-15) = sin 60 3x-15 = 60 x = 25 tan^2 (25+5) + sin^2 (2x25+10)	

	$\tan^2 30 + \sin^2 60$ $= 3 + ¾$ $= 15/4$	
Ans18	m+n = 2tanA m – n = 2 sin A (m+n) (m-n) = 2tanA 2 sinA $m^2-n^2 = 4 \tan A \sin A$ $4\sqrt{m\ n}$ $=4\ \sqrt{(sinA + tanA)\ (tanA - sinA)}$ $4\sqrt{tan^2A - \ sin^2A}$ $4\sqrt{\frac{sin^2A}{cos^2A} - Sin^2A}$ $4\sqrt{sin^2A\ \left(\frac{1}{cos^2A} - 1\right)}$ $4\sqrt{sin^2A\ \left(\frac{1-cos^2A}{cos^2A}\right)}$ $4\sqrt{\frac{sin^4A}{cos^2A}}$ $= 4\ \frac{sin^2A}{COS^2A}$ = 4 tan A sin A	`
Ans19	a) $3\cos^2A + 7 \sin^2A = 4$ $3\cos^2A + 3\sin^2A + 4\sin^2A = 4$ $3 (\cos^2A+ \sin^2A) = 4 – 4 \sin^2A$ $3 = 4 (1 –\sin^2A)$ $¾ = \cos^2A$ $\cos A = \frac{\sqrt{3}}{2}$ $\tan A = \sqrt{3}$ b) $(\cos A+ \sin A)^2 = (\sqrt{2} \cos A)^2$ $\cos^2A + \sin^2A + 2 \sin A \cos A = 2 \cos^2A$ $1+2 \sin A \cos A = 2\cos^2A$ $2 \sin A \cos A = 2 \cos^2A-1$ Now, $(\cos A – \sin A)^2 = \cos^2A + \sin^2A – 2 \sin A \cos A$ $(\cos A – \sin A)^2 = 1-2 \sin A \cos A$ $(\cos A – \sin A)^2 = 1-2 \cos^2A+1$ $(\cos A – \sin A)^2 = 2-2 \cos^2A$ $(\cos A – \sin A)^2 =2 (1-\cos^2A)$ $(\cos A- \sin A)^2 = 2\sin^2A$ $(\cos A – \sin A) = \sqrt{2}sinA$	
Ans20	$X^2+y^2+z^2$ $= r^2 \sin^2A \cos^2B + r^2 \sin^2A \sin^2B + r^2 \cos^2A$ $=r^2 \sin^2A (\cos^2B+ \sin^2B) + r^2 \cos^2A$ $= r^2 \sin^2A + r^2 \cos^2A$ $= r^2 (\sin^2A+ \cos^2A)$ $= r^2$	
Ans21	Tan 45 = $\frac{h}{x}$ h = x tan 30 = $\frac{h}{10+x}$ $\frac{1}{\sqrt{3}} = \frac{h}{10+h}$ $10+h = \sqrt{3}h$ $10 = \sqrt{3}h-h$ $10 = (\sqrt{3} -1) h$  	

<table>
<tr><td></td><td>
h = $\frac{10}{\sqrt{3}-1}$
h = $\frac{10}{\sqrt{3}-1}$ x $\frac{\sqrt{3}+1}{\sqrt{3}+1}$
h = $\frac{10(\sqrt{3}+1}{3-1}$
h = $\frac{10(1.73+1)}{2}$
h = $\frac{27.3}{2}$ = 13.65m
</td><td></td></tr>
<tr><td>Ans22</td><td>
Let the speed be x km/hrs
y =$\frac{15x}{60X60}km$
tan 45 = 3000/2
z = 3000 m = 3 km.
$tan30$ = $\frac{3}{y+z}$
$\frac{1}{\sqrt{3}}$ = $\frac{3}{y+3}$
y+3 = 3$\sqrt{3}$
y =3$\sqrt{3}$-3
$\frac{15x}{60x60}$ = 3 $\sqrt{3}$-3
x=$\frac{3(\sqrt{3}-1)X60X60}{15}$
x = $\frac{3600}{5}$ (1.73-1)
x = 720x 0.73
x = 525.6 km/hr


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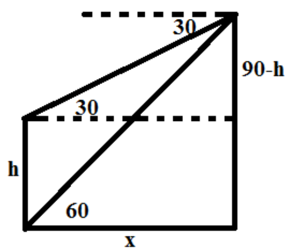
<tr><td>Ans23</td><td>
tan 60 = $\frac{90}{x}$
$\sqrt{3}$ = $\frac{90}{x}$
x = $\frac{90}{\sqrt{3}}$
tan 30 = $\frac{90-h}{x}$
$\frac{1}{\sqrt{3}}$ = $\frac{90-h}{90/\sqrt{3}}$
90 = 3(90-h)
60= 90-h
h = 30 m


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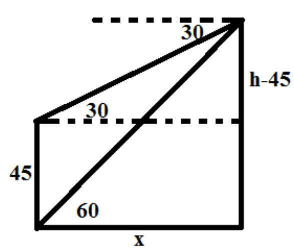
<tr><td>Ans24</td><td>
tan 60 = $\frac{h}{x}$
x = $\frac{h}{\sqrt{3}}$
tan 30 = $\frac{h-45}{x}$
$\frac{1}{\sqrt{3}}$ = $\frac{h-45}{h/\sqrt{3}}$
h = 3 (h-45)
h = 3h – 135
h = $\frac{135}{2}$ = 67.5 m.


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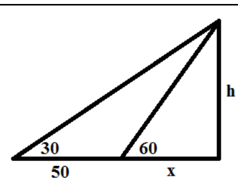
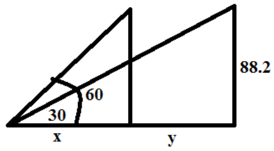
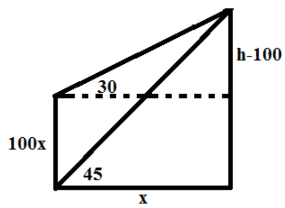
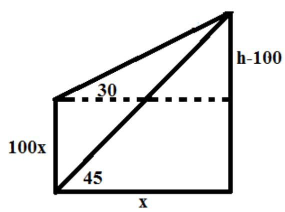
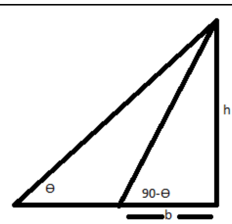
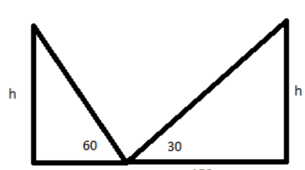
<tr><td>Ans25</td><td>
tan 60 = $\frac{h}{x}$
h = x $\sqrt{3}$
tan 30 = $\frac{h}{x+50}$
$\frac{1}{\sqrt{3}}$ = $\frac{x\sqrt{3}}{x+50}$
x + 50 = 3x
(i) x = 25 m
(ii) h = 25$\sqrt{3}$ m


</td><td></td></tr>
</table>

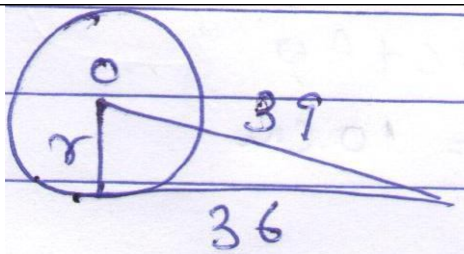
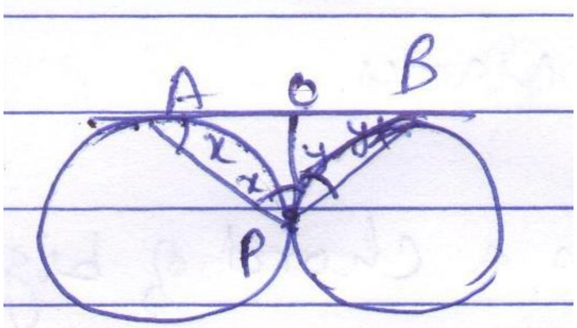
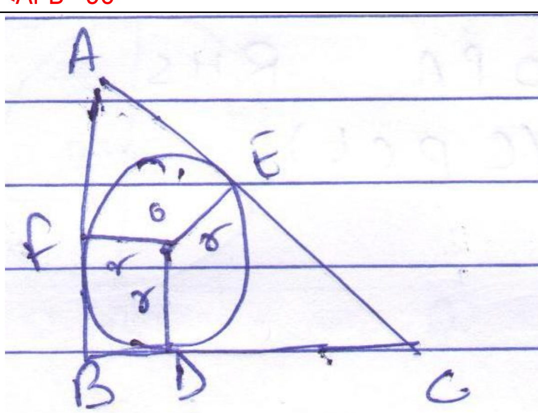
Ans26	$\tan 60 = \frac{88.2}{x}$ $\sqrt{3} = \frac{88.2}{x}$ $x = \frac{88.2}{\sqrt{3}}$ $\tan 30 = \frac{88.2}{x+y}$ $\frac{1}{\sqrt{3}} = \frac{88.2}{\frac{88.2}{\sqrt{3}}+y}$ $\frac{1}{\sqrt{3}} = \frac{88.2\sqrt{3}}{88.2+\sqrt{3}y}$ $\sqrt{3}\,y + 88.2 = 88.2x3$ $\sqrt{3}y = 264.6 - 88.2$ $y = \frac{176.4}{\sqrt{3}}$ $y = \frac{176.4\ X\ \sqrt{3}}{3}$ $y = 58.8\sqrt{3}$ m  	
Ans27	$\tan 45 = \frac{h}{x}$ $x = h$ $\tan 30 = \frac{h-100}{x}$ $\frac{1}{\sqrt{3}} = \frac{h-100}{h}$ $h = \sqrt{3}\,h - 100\sqrt{3}$ $100\sqrt{3} = \sqrt{3}\,h - h$ $\frac{100\sqrt{3}}{\sqrt{3}-1} = h$ $h = \frac{100\sqrt{3}\ (\sqrt{3}+1)}{3-1} = \frac{100(3+\sqrt{3})}{2} = 50\,(3+\sqrt{3})$m $x = h = 50\,(3+\sqrt{3})$m  	
Ans28	$\tan 45 = \frac{h}{x}$ $x = h$ $\tan 30 = \frac{h-100}{x}$ $\frac{1}{\sqrt{3}} = \frac{h-100}{h}$ $h = \sqrt{3}\,h - 100\sqrt{3}$ $100\sqrt{3} = \sqrt{3}\,h - h$ $\frac{100\sqrt{3}}{\sqrt{3}-1} = h$ $h = \frac{100\sqrt{3}\ (\sqrt{3}+1)}{3-1} = \frac{100(3+\sqrt{3})}{2} = 50\,(3+\sqrt{3})$m $x = h = 50\,(3+\sqrt{3})$m  	
Ans29	$\tan\Theta = \frac{h}{a}$ $\tan(90-\Theta) = \frac{h}{b}$ $\cot\Theta = \frac{h}{b}$ $\tan\Theta = \frac{b}{h}$ $= \frac{b}{h} = \frac{h}{a}$ $= h^2 = ab$ $H = \sqrt{ab}$  	
Ans30	$\tan 60 = \frac{h}{x}$ $x\sqrt{3} = h$ $\tan 30 = \frac{h}{150-x}$ $\frac{1}{\sqrt{3}} = \frac{x\sqrt{3}}{150-x}$ $150-x=3x$  	

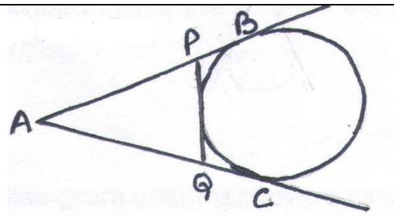
	150=4x x = 37.5m h = $37.5\sqrt{3}$m	

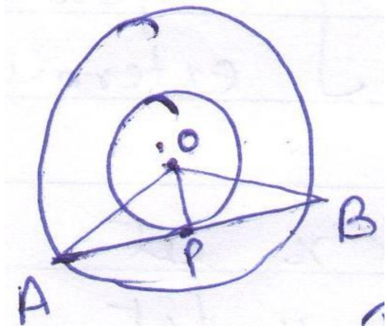
THE ASIAN SCHOOL, DEHRADUN

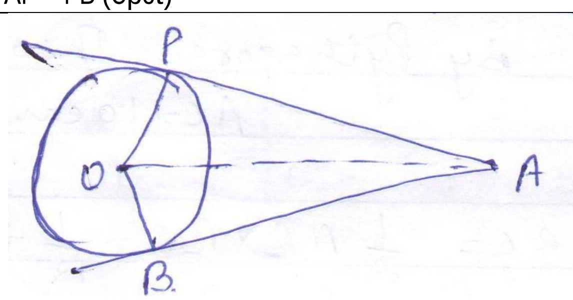
Test Paper Session 2017-18

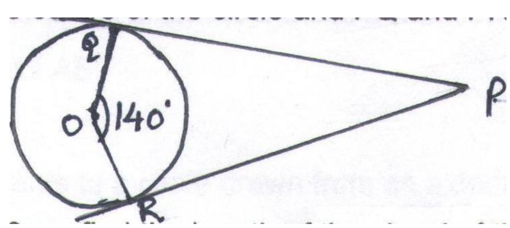
CLASS 10 SUBJECT Mathematics CHAPTER- 10 Circles

Ans1.	 r = $\sqrt{39^2 - 36^2} = \sqrt{75x3}$ r = 15cm.	1
Ans2	 AO = OP Tangents from OP = OB External point <OAP = <OPA = x let Similarly < OPB = <OBP= y let <A+ <P+<B = 180 <A + <0PA + <0PB+ <B = 180^0 2x + 2y = 180 x+y = 90 <APB= 90^0	1
Ans3	 BC = 6 cm, AB = 8 cm by Pythagoras theorem AC = 10 cm area of ΔABC = ½ AB x BC = ½ 8x6 = 24cm^2 also area of ΔABC = $\frac{1}{2}$ x Bc x r + $\frac{1}{2}$ ACx r + $\frac{1}{2}$ ABx r 24 = $\frac{1}{2}$r [6 + 10+ 8] 48 = 24r r = 2 cm	1

<table>
<tr><td>Ans4</td><td>

AB = AC
PB = PR   Tangents from external point
QR = QC
Perimeter of Δ APQ
= AP + PQ + AQ
= AP + PR+ RQ + AQ
= AP + PB + QC + AQ
Perimeter of ΔAPQ = AB + AC = 10 cm</td><td>1</td></tr>
<tr><td>Ans5</td><td>

Given : AB is a chord of bigger circle centre O.
To prove AP = PB
Join OA ,OB and OP
Proof : AB is ⊥ to OP as radius is ⊥ to tangent at point of contact
In ΔOAP and ΔOAB
OA = OB = radius of bigger circle
<OPB = <OPA each 90^0
OP = OP common
ΔOPB ≅ ΔOPA RHS
AP = PB (Cpct)</td><td>2</td></tr>
<tr><td>Ans6</td><td>

Given Two tanget AP and AB, O is centre
To prove AP = AB
Proof : Δ OPA and ΔOBA
OP = OB = radius of circle
<OPA = <OBA – tangent is perpendicular to radius at point of contact
OA = OA common
Δ OPA ≅ ΔOBA RHS   AP = AB (Cpct)</td><td>2</td></tr>
<tr><td>Ans7</td><td><O + <Q + <R+ x = 360^0
OQPR is quadrilateral so, 140+ x = 180
[∴ <Q = <R = 90^0
Tangent makes 90^0 with radius at point of contact]
x = 180-140 = 40

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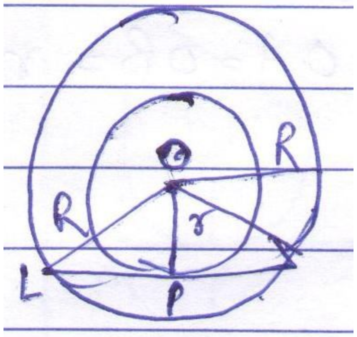
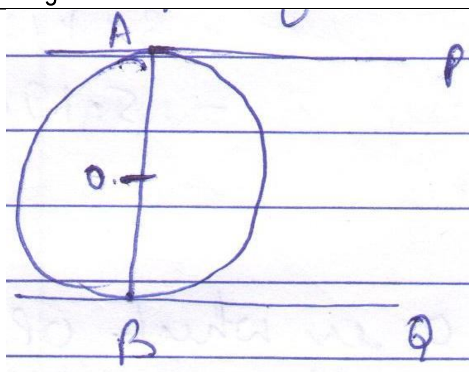
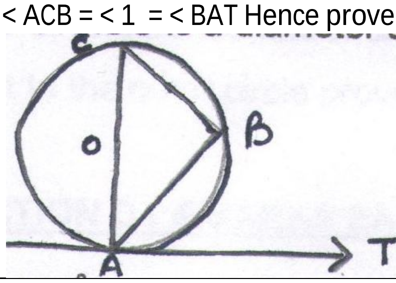
<tr><td>Ans8.</td><td>


r = 3 cm , R = 5 cm
In Δ OPL   OL = 5 cm
OP = 3 cm
LP = $\sqrt{OL^2 - OP^2}$ = $5^2 - 3^2$ = $\sqrt{16}$
LP = 4
Length of chord = 2x 4 = 8 cm.</td><td>2</td></tr>
<tr><td>Ans9</td><td>


Let AB be the diameter of circle
< OAP = < OBQ = 90
Radius is ⊥ to tangent at point of contact.
<OAP + < OBQ = 180
Which prove cointerior angles are supplementary ➝AP II BQ</td><td>2</td></tr>
<tr><td>Ans10</td><td>Given AB is a chord
AOC is a diameter
To Prove : < BAT = < ACB
Proof : AOC is diameter
➝ < ABC = 90^0
Let < BAT = 1, < BAC = 90- <1
∴ In Δ ABC
< ACB + < CAB + < CBA = 180
<ACB + 90-< 1 + 90 = 180
< ACB = < 1 = < BAT Hence prove.

</td><td>2</td></tr>
<tr><td>Ans11</td><td></td><td>2</td></tr>
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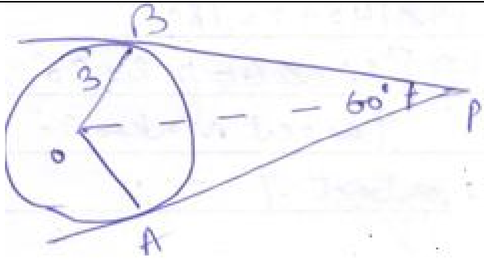
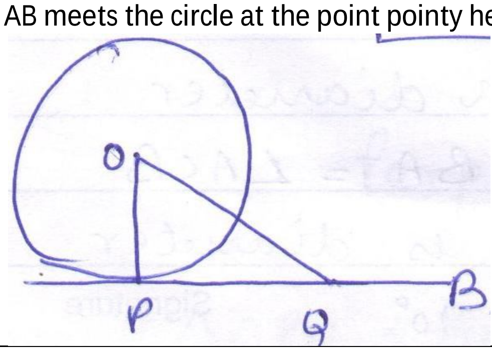
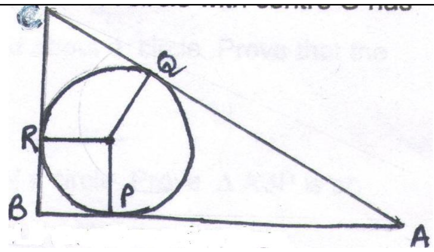
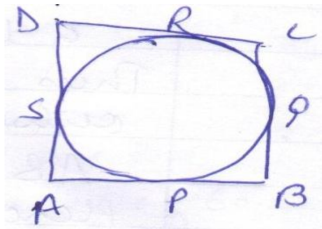
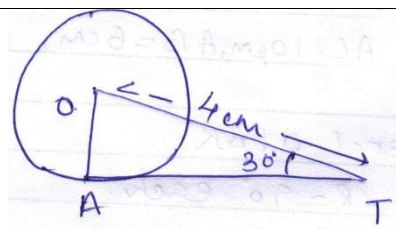
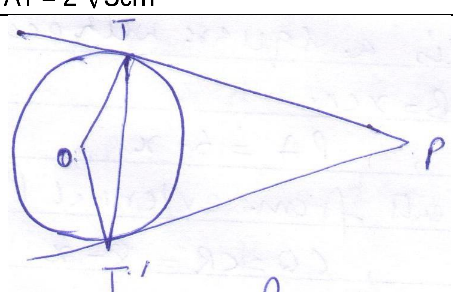
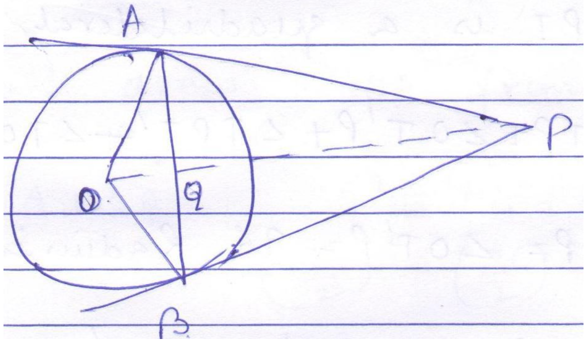
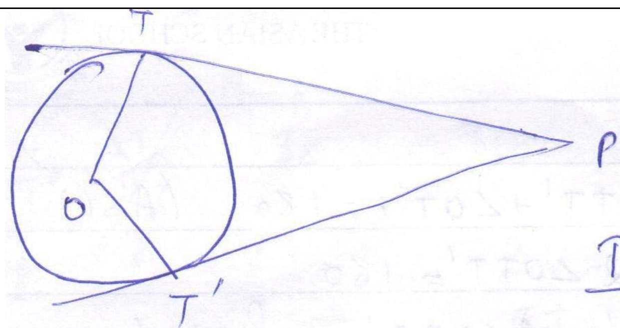
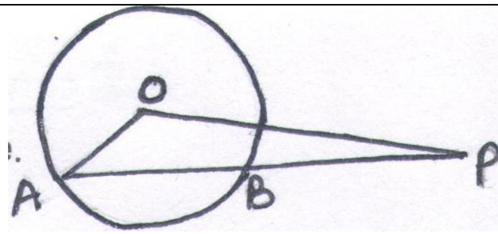
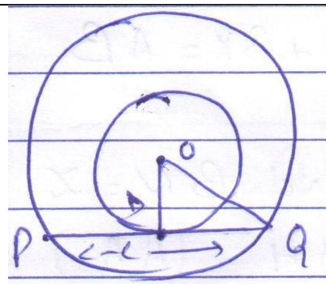
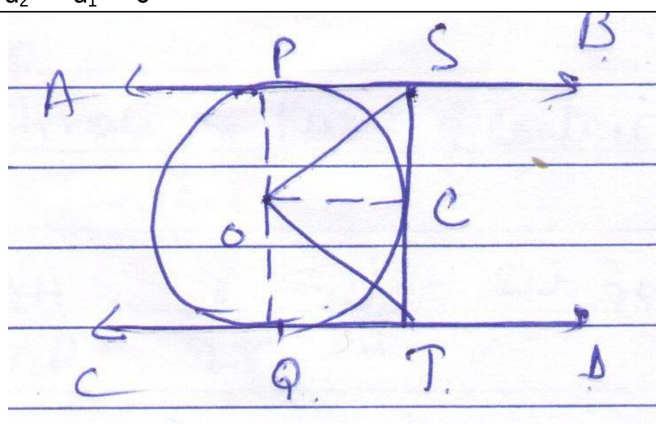
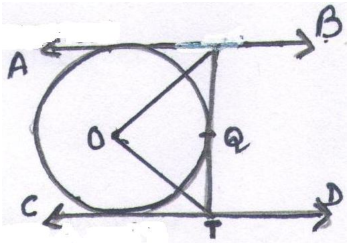
	 Given AP and BP are two tangents included at an angle of 60^0 . To find AP Proof : $\Delta OPB \cong \Delta OPA$ as < OBP = < OAP = 90 RHS OP = OP OA = OB = radius < OPB = < OPA = $\frac{60}{2}$ = 30^0 ΔOBP $\frac{OB}{BP}$ = tan 30^0 3 = $\frac{BP}{\sqrt{3}}$ BP =3 $\sqrt{3}$ 3x 1.732 = 5.196 cm.	
Ans12	Given A circle with centre O in which OP is a radius and AB is a line through P such that OP ⊥ AB To prove : AB is a tangent to the circle at the point P. Construction :Take a point Q different from P on AB join OQ. Proof : We know that the perpendicular distance from a point to a line is the shortest distance between then OP⊥ AB. OP is the shorteest distance form O to AB OP < OQ q lies outside the circle. Thus every point on AB other than P, lies outside the circle. AB meets the circle at the point pointy hence AB is the tanget to the circle at the point P. 	2
Ans13	Given AB = 6 cm, BC = 8 c, AC = $\sqrt{8^2 6^2}$ = $\sqrt{100}$ = 10 To find , Radius of the circle Proof : lest x be the radius of the circle in right ΔABC , AC = 10 gm, AB = 6 cm, BC = 8 cm Now in quadralateral OPBR <B = <P = <R = 90^0 each < ROP = 90^0 OP = OR OPBR is a square with each side x cm BP = PB = xcm CR = 8-x , PA = 6-x AQ = AP tangents from external point AQ = AP = 6-x , CQ = CR = 8-x AC = AQ + CQ 10 = 6-x + - x 2x = 4 x = 2 cm,	3

	 	
Ans14	Given : A parallelogram say ABCD. Let the parallelogram touch the circle at the point P,Q R, and S, As AP and AS are tangents to the circle drawn from an external point A.  AP = AS, BP = BQ CR = CQ, DR = DS adding all we get (AP + BP) + (CR + DR) = AS + BQ + CQ + DS = AS + DS + BQ + CQ AB + CD = AD + BC AB + AB = AD + AD ∴ CD = AB, BC = AD Opposite sides of Parallelogram 2AB = 2AD AB = AD ABCD is a rhumbus	3
Ans15	 In right Δ O AT, Cos 30 = $\frac{AT}{0T}$ $\frac{\sqrt{3}}{2} = \frac{AT}{04}$ AT = 2 $\sqrt{3}$cm	3
Ans16	 Given :Two tangents PT and PT' To prove < TPT' = 2<OTT' Proof <OTP = <OT'P = 90 Radius is ⊥ to tangent < TOT' + < TPT' = 180 <TOT'= 180 - <TPT' ΔOTT', OT = OT' radius <OTT' = <OT'T angle opposite to equal sides of Δ. ΔOTT'	3

	< TOT' + <OTT' + <OT'T = 180 (ASP) 180-<TPT' + 2<OTT' = 180 <TPT' = 2<OTT' Proved	
Ans17	 Given two tangents PA and PB are drawn. To prove : OP is perpendicular bisector of AB i.e. AQ = QB and AQO = <AQP= 90^0 Proof : <QPA = <QPB ∴ Δ OAP ≅ ΔOBP <QPA = <QBP ∴ AP = BP QP = QP common ΔPQA ≅ ΔPQB AAS QA = QB → OP bsects AB ΔOQA ≅ ΔOQB (SAS) ∴ OA = OB = radius AQ = QB proved <OAB = <OBA ∴ OB = OA = <OQA = <OQB But <OQA + <OQB = 180 2<OQA = 180 i.e. < OQA = 90 <OQA = <OQB = 90^0 hence proved. OP is ⊥ bisector of AB.	3
Ans18	 Given PT and PT' are two tangents To prove : <TPT' + <TOT' = 180 Proof : OT' PT os a quadrilateral <OTP + <OT'P + <TPT' + <TT'O = 360 <OTP = <OT'P= 90^0 Radius is ⊥ to tangent. 90+90 + <TPT' + <TOT' = 360 <TPT' + <TOT' = 180	3
Ans19	Given OP = 13 cm AB = 7 cm BP = 9cm To find radius of circle.	3

	 Proof Draw $OD \perp AB$ AD = DB ($\perp$ drawn from centre bisects the chord) AD = D B = 3.5cm, PD = PB + BD = 9 + 3.5 = 12.5 cm In Δ ODP , $OP^2 = OD^2 + PD^2$ $13^2 = (OD)^2 + (12.5)^2$ $OD^2 = 169 – 156.25 = 12.75$ In Δ ODB $OB^2 = OD^2 + OB^2$ $OB^2 = 12.75 + (3.5)^2 = 25$ $OB = \sqrt{25} = 5$ cm Radius of the circle is 5 cm.	
Ans20	 Given : Two concentric circles with diameter d2 >d1 To prove : $d2^2 = c^2 + d_1^2$ Proof draw $\perp$ OD from centre O to thord PQ Δ ODQ $OQ^2 = OD^2 + DQ^2$ $(d2/2^2) = (d1/2)^2 + (C/2)^2$ $d_2^2 = d_1^2 + C^2$	3
Ans21	 Given AB and CD are two paralel tangents ST is also a tangent To Prove : $<SOT = 90^0$ Proof : PS = SC tangent from external points PO = OC radius OS common Δ SPO $\cong$ ΔSCO by SSS <PCO = <OSC Cpct <PSC = 2 <OSC Similarely we can prove that : <CTO = <OTQ <CTQ = 2 < OTC	4

<table>
<tr><td></td><td>
$\therefore AB \parallel CD \quad < PSC + \Delta QTC = 180$
$2<OSC + 2<OTC = 180$
$< OSC + <OTC = 90$
In Δ SOT $< SOT + <OSC + <OTC = 180$
So Δ $< SOT = 90^0$


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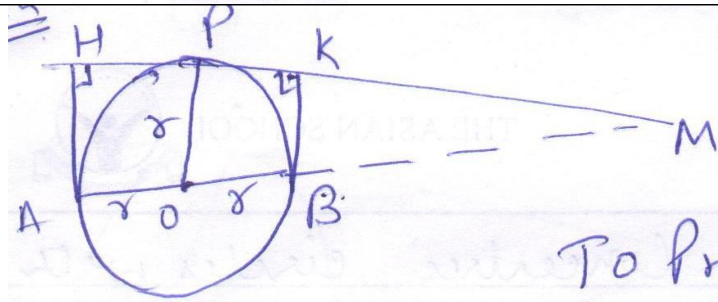
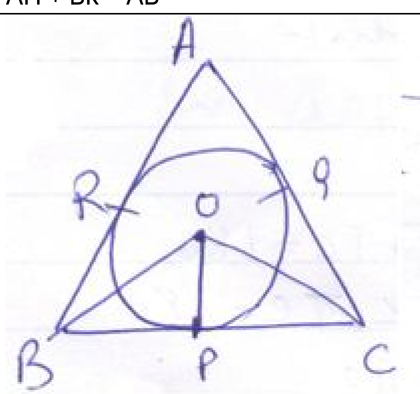
<tr><td>Ans22</td><td>


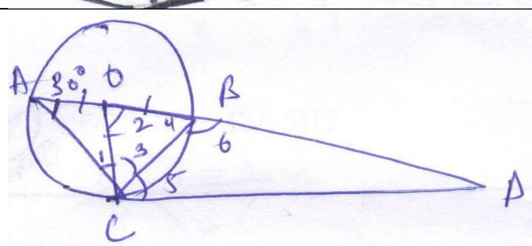
Given AB is a AH Bx are perpendicular from A and B to tangent.
To Prove AH + BX = AB
Proof let AH = x , Bk = y and BM = z
Δ MBK ~ Δ MAH (AA)
$\frac{BK}{AH} = \frac{BM}{AM}$
$\frac{y}{x} = \frac{z}{z+2r}$ = z (x-y) = 2ry

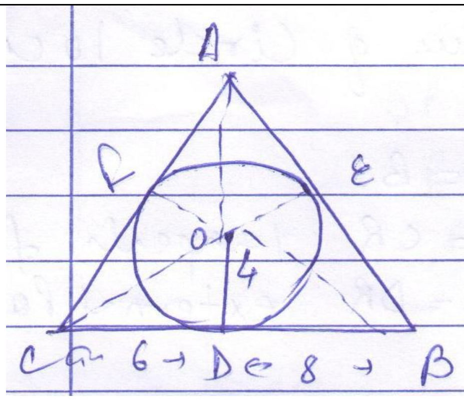
$Z = \frac{2ry}{x-y}$ (1)
Similarly Δ
MBK ~ Δ MOP (AA)
$\frac{BK}{OP} = \frac{BM}{OM}$

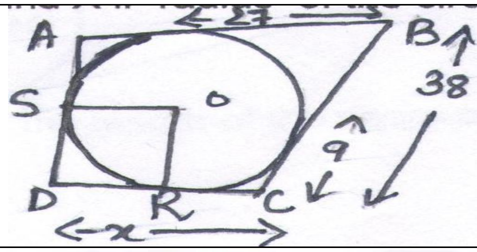
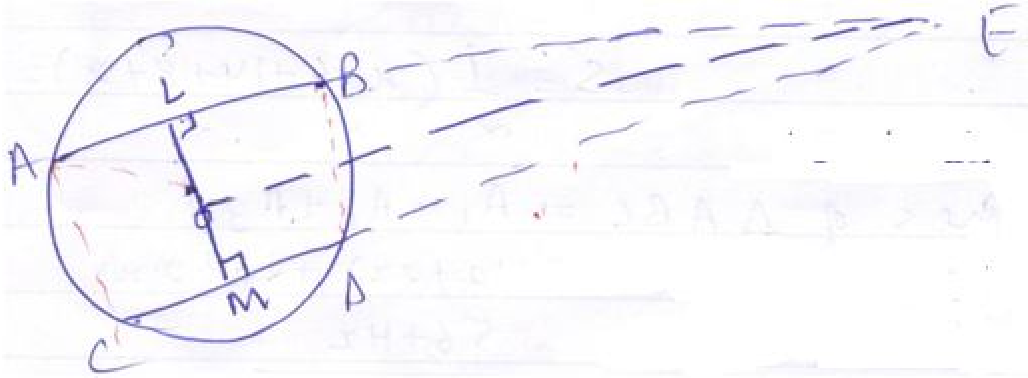
$\frac{y}{r} = \frac{z}{z+r}$ = z (r-y) = yr
$z = \frac{yr}{r-y}$ (2)

From 1 and 2
$\frac{2ry}{x-y} = \frac{yr}{r-y}$
2r– 2y = x-y
X+y = 2r
AH + Bk = AB
</td><td>4</td></tr>
<tr><td>Ans23</td><td>


Given : ΔABC, AB = AC
To prove : BP = PC
Proof Join OB and OC
</td><td>4</td></tr>
</table>

	In ΔOBP and ΔOCP OB = OC = radius of circle <OPB = <OPC = 90 (radius is ⊥ to tangent) OP = OP common Δ OPB ≅ΔOPC RHS PB = PC Hence proved	
Ans24	Given : OP is equal to diameter of circle To prove ΔABP is an equilateral Δ Proof Let <OPA = <OPB = Q tangents are equally inclined. Let radius of the circle be r < 1 = 90^0 radius through point of contant is ⊥ to tangent. In right Δ OAP sin $Q = \frac{OA}{OP} = \frac{r}{2r} = \frac{1}{2}$ = sin 30^0 Q = 30 <APB = 20 = 60 Since PA = PB length of tangent from external point <2 = <3 Δ APB < 2 + 3 + <APB = 180 <2 + <2 + 60 = 180 2<2 = 120^0 <2= <3 = 60^0 So all angles of ΔAPB are 60^0 Δ APB is an equilateral Δ. 	4
Ans25	 Given: CD is a at contact point C AOB to diamet or which meets tangents produced at D. Chord AC makes <A = 30^0 with AB To prove : BD = BC Proof : Δ OAC, OA = OC = r radii < 1 = <A angle opposite to equal sides <1 = 30^0 <BOC = <2 = <1 + <A = 30+ 30 = 60^0 ΔOCB OB = OC radii <3 = <4 <3 + <4 + <COB = 180^0 <3 + <3 + 60 = 180 2 < 3 = 120^0 <3 = 60^0 = <4 <6 + <4 = 180^0 Linear pair < 6 = 180 -<4 = 180 – 60 = 120 <OCD = 90^0 < 3 + <5 = 90 < 5 = 90 -<3 = 90 – 60 = 30^0 Δ BCD < 5 + <6 + <D = 180^0 120 + 30 + <D = 180 ∠C =< D = 30^0 BC = BD sides opposite to equal angles.	4

Ans26	 Given CD = 6 cm, BD = 8 cm radius 4 cm Join OC OA and OB We know CD = CF = 6 cm BD = BE = 8 cm AF = AE = x cm Δ OCB area of ΔA1 = $\frac{1}{2}$ X CB X OD = $\frac{1}{2}$x 14x4 = 28 Δ OCA area of Δ A2 = $\frac{1}{2}$x AC x OE = $\frac{1}{2}$ (6+x) x 4 = 12 + 12x area of Δ A3 = $\frac{1}{2}$ x AB x DE = $\frac{1}{2}$ (8+x) x 4 = 16 + 2 x Semiperi meter of ΔABC = $\frac{1}{2}$ (AB + BC + AC) S = $\frac{1}{2}$ (x + 6+14+8+x) = 14+x area of ΔABC = A1 + A2 + A3 28 + 12+ 2x + 16+2x 56 + 4x area of ΔABC = $\sqrt{S(S-9)(S-b)(S-c)}$ = $\sqrt{(14+x)\ (14+x-14)(14+x-x-6)(14-8)}$ = $\sqrt{(14+x)(x)(8)(6)}$ $\sqrt{(14+x)48x}$ = 56 + 4x Squaing (14+x) 48x = 16 $(14+x)^2$ 3x = 14+x 2x = 14 x = 7 AC = 6 + x = 6+7 = 13 cm AB = 8 + x = 8+7 = 15 cm	4
Ans27	Radius of circle 10 cm BU = BT CT = CR tangents from DS = DR external points BT = BU = 27 CT = 38-27 = 11 CT = CR = 11 cm DR = x – 11 DR = S0 = x-11 = radius of circle x -11 = 10 x = 21 $\therefore$ < D = 90^0 < 1 = <2 = 90 radius is $\perp$ to tangent DROS is a square $\therefore$ DR = OS	4

		
Ans28	 Construction : Draw OI ⊥ AB and OM⊥CD In Δ EOL and ΔEOM <OLE = <OME each 90 OL = OM Equal chords are equidestant from centre OLE = OE ΔOIF ≅ ΔOME RHS EL = EM (Cpct) ∴ AB = CD $= \frac{1}{2}$ AB = $\frac{1}{2}$ CD = BL = DM EB + BL = ED + DM = EB = ED	4

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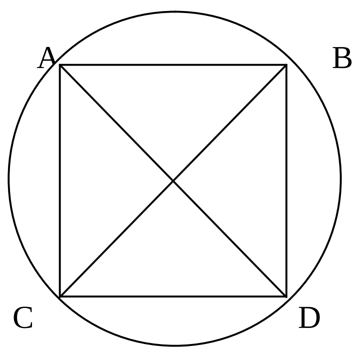
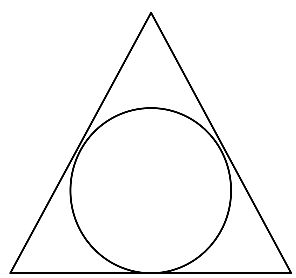
CLASS 10 SUBJECT Mathematics CHAPTER- 12 Area Related to Circles

Ans1	π r + 2r = 36 r $= \frac{36}{\pi+2}$ = 7 d = 14 cm	1
Ans2	Area = 81 $a^2 = 81$ a = 9 P = 36 cm πr + 2r = 36 r = 7 Area = $1/2\pi\ r^2$ = ½ x $\frac{22}{7}$ = 77 cm^2	1
Ans3	r = 21 cm Ans= 21πunits	
Ans4	2 πr = 49 r = 2a/ π ratio of areas = $\pi r^2/a^2$ = $\pi(4/\pi^2) = 4/\pi$	
Ans5	2 πr = 100 r = $\frac{100}{\pi}$d = $\frac{200}{\pi}$ Let side of square is a. $a^2 + a^2 = \left(\frac{200}{\pi}\right)^2$ $2a^2 = \frac{40000}{\pi^2}$ $a^2 = \frac{20000}{\pi^2}$ a = $\frac{100\sqrt{2}}{\pi}$ 	
Ans6	r = 14 cm ; 1 min = 6^0 15 min = 90^0 Area = $\frac{\theta}{360}$ x πr^2 = $\frac{90}{360}\pi$ 14 x 14 = 49 π cm^2	
Ans7	πr + 2r = 66 r $= \frac{66}{\pi+2}$	
Ans8	a = side of square r = radius $a^2 = \pi r^2$ $\frac{a}{r}$ = √π Ratio of perimeter = $\frac{4a}{2\pi r} = \frac{2}{\pi}$√π = $\frac{2}{\sqrt{\pi}}$	
Ans9	1 min = 6^0 35 min = 210^0 Area = $\frac{\theta}{360}$ x πr^1 = $\frac{210}{360}$ x π x 14 x 14 = $\frac{343}{3}$ x $\frac{22}{7} = \frac{1078}{3}$ cn^2	
Ans10	Similar to answer 9	

Ans11	$\pi r^2 = 2\pi r$ r = 2	
Ans12	If we fold the semicircle then the slant height will be 14cm, let radius of cone be R, and height be h. d = 28; r = 14 $\pi r = R(2\pi)$ R = 7 cm $H^2 = 14^2 - 7^2 = 147$ $H = 7\sqrt{3}$ cm Volume = $\pi r^2 h = \frac{22}{7} \times 49 \times 7\sqrt{3}$ $= 1078\sqrt{3}\, cm^3$	
Ans13	$2\pi r = 22$ $r = \frac{11}{\pi} = 11 \times \frac{7}{22} = \frac{7}{2}$ Area of quadrant $= \frac{1}{4}\pi r^2$ $= \frac{1}{4} \times \frac{22}{7} X \frac{7}{2} \times \frac{7}{2} = \frac{77}{8}$ cm	
Ans14	r = 12 cm θ= 120^0 Area of minor segment $= \frac{120}{360} \times 3.14 \times 12^2 - \frac{1}{2} \times 12^2 \times \frac{3}{2}$ $= 12^2\left(\frac{3.14}{3} - \frac{1.73}{4}\right)$ $= 144\left(\frac{12.56-5.19}{12}\right)$ $= 144 \times \frac{7.37}{12} = 88.44\ cm^2$	
Ans15	If we assume a square shaped filed, Increase in area : $= \frac{90}{360} \times \pi\, 23^2 - \frac{90}{360} \times \pi\, 16^2$ $= \frac{1}{4}\pi(529 - 256)$ $= 2\,\frac{273}{4} \times \frac{22}{7} = \frac{6006}{28}\ cm^2$	
Ans16	Let radius of circle is r and side of square is 12cm. Area of remaining part : Area of Δ – Area of circle $\sqrt{\frac{3}{4}}side^2 = 3\left(\frac{1}{2} X\, 12\, X\, r\right)$ $\sqrt{\frac{3}{4}} \times 12^2 = 18r$ $r = 2\sqrt{3}$ ∴ Area = $\sqrt{\frac{3}{4}} \times 12^2 - \pi(2\sqrt{3})^2$ $= (36\sqrt{3} - 12\pi)\ cm^2$ 	
Ans17	side of square = 14 cm Area of shaded part : $= side^2 - 4$sectors $= 14^2 - 4 \times \frac{90}{36} \times \pi 7^2$ $= 196 - 49\pi$ $= 196 - 154 = 42\ cm^2$	
Ans18	$r^2 + r^2 = 25$ $r^2 = \frac{25}{2}$ $r = \frac{5}{\sqrt{2}}$. Area of minor segment	

	$\frac{90}{360}$X 3 : 14 x $\left(\frac{5}{\sqrt{2}}\right)^2$- 1/2X $\left(\frac{5}{\sqrt{2}}\right) X$ sin 90 $\frac{3.14\ X\ 25}{8}$- $\frac{25}{4}$ =$\frac{25}{4}$ (1.57- 1) = 6.25 x .57 = 0.35625 cm^2 Area of circle = πr^2 = $\frac{22}{7}$ x $\left(\frac{5}{\sqrt{2}}\right)^2$ = 3.14 x 6.25 = 19.62 cm^2 Area of major segment = 19.62 – 0.36 = 19.20 cm Difference of segment = 19.26 – 0.36 = 18.9 cm^2	

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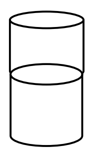
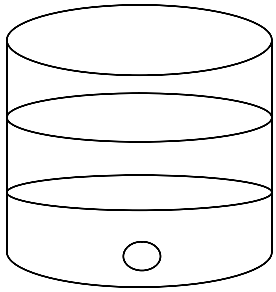
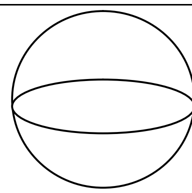
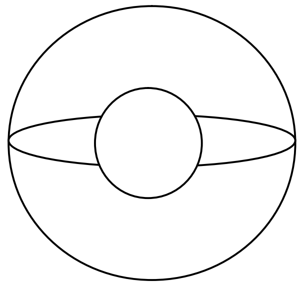
CLASS 10 SUBJECT Mathematics CHAPTER- 13 Surface Area and Volume

Ans1	Radius of cylinder = 3x Radius of cone = 4 x Height of cylinder = 2y Height of cone = 3y Ratio of volume = 9:8	1
Ans2	Volume of sphere = volume of wire $\frac{4\pi}{3}3^3 = \pi$ x 1^2 x h h = 9x 4 = 36 cm	1
Ans3	1 : 8	1
Ans4	l = $\sqrt{h^2 + (R-r)^2}$ l = $\sqrt{6^2 + (20-12)^2}$ = 10cm	1
Ans5	h = 15 cm, r = 8 cm l = $\sqrt{n^2 +}$ l = $\sqrt{225 + 64}$ = 17 cm CSA = πrl = π8 x 17 = 136πcm^2	2
Ans6	Let height = h and radius = r , then  TSA = 2πr (2h) = 4π rh	2
Ans7	r = 5 cm $\pi r^2 + \pi rl = 90\pi$ $5\pi(5 + l) = 90\pi$ h = $\sqrt{l^2 - r^2}$ h = $\sqrt{169 - 25}$ = 12 cm	2
Ans8	No. of lead shots = $\frac{vol\ cuboid}{vol\ of\ lead\ shot}$ = $\frac{lx\ bx}{\frac{4}{3}x\frac{22}{7}x\frac{0.3}{2}x\frac{0.3}{2}}$ =1260	2
Ans9	$\pi r^2h = 567$ $r^2h = 567$; h=7cm h = 7 cm r^2 = 567/7, implies r = 9 cm	2
Ans10	r = 2x ; h = 3x v = 1617 $\pi(2x)^2(3x) = 1617$ $x^3 = \frac{1617}{12}$x$\frac{7}{22\ 2} = \frac{343}{8}$ x = $\frac{7}{2}$ so; r = 7 cm h = $\frac{21}{2}$ cm CSA = 2πr h = 2 x $\frac{22}{7}$ x 7 x $\frac{21}{2}$ = 462 cm ^{2}	2
Ans11	Volume of cone = volume of sphere $\frac{1}{3}\pi^2$ h = $\frac{4}{3}\pi r^3$ 6x6x24 = 4 R^3 R = 6 cm	2

Ans12	Let x is the height raised. $\pi r^2 x = \frac{4}{3}\pi\ r^3$ $6^2 X x = \frac{4}{3} x\ 6^3$ x = 8 cm 	2
Ans13	d = 14 cm r = 7 cm TSA = 2 ($3\pi r^2$) = $6\ \pi\ r^2$ = $6\pi\ x\ 7^2 = 294\ \pi\ cm^3$ 	
Ans14	Outer radius R = 5 cm, Inner radiusr = 3 cm h = $\frac{32}{3}$cm $\frac{4}{3}\ \pi\ (R^3 – r^3) = \pi\ r^2 h$ $\frac{4}{3}\ (5^3 – 3^3)$ = r X 32/3 $\frac{4}{3}$x 98 = $\frac{r^2 x 3^2}{3}$ $r^2 = \frac{196}{16}$ r = $\frac{14}{4} = \frac{7}{2}$cm d = 7 cm	
Ans15	No. of spheres = $\frac{vol\ of\ cylinder}{vol\ of\ sphere}$ = $\frac{\pi r^2 h}{\frac{4}{3}\pi r^3}$ $\frac{22\ x\ 45}{\frac{4}{3} x\ 3\ x\ 3x\ 3}$ = 5	
Ans16	r = 8 cm R = 20 cm V = 10459 $\frac{3}{7}$ V = $\frac{73216}{7}$ cm^3 $\frac{1}{3}\pi(R^2 + r^2 + Rr) = \frac{73213}{7}$ $\frac{1}{3}$x $\frac{22}{7} h$ (400 + 64 + 160) = $\frac{73216}{7}$ h= $\frac{73216\ x\ 3}{22x\ 624\ 208}$ = 16 cm Area of a sheet = $\pi r^2 + \pi rl$ l = $\sqrt{h^2 + (R-r)^2}$ l = $\sqrt{16^2 + (12)^2}$ = 20 Area = π x 64 + π x 8 x 20 = 224 πcm^2 Cost = 1.4 x $\frac{224\ X\ 22}{7}$ = Rs. 985.60	

Ans17	Volume of frustum $= \frac{1}{3}\pi$ h $(R^2 + r^2 + Rr)$ $= \frac{1}{3}$ x $\frac{22}{7}$ x 30 $(20^2 + 10^2 + 20$ x $10)$ $= \frac{220}{7}$ x 700 = 22000 cm^2 = 22 litres Cost of milk = 22 x 25 = Rs. 5550	
Ans18	D = 18 cm ; R = 9 cm Inner radius = r cm $\frac{4}{3}\pi (R^3 - r^3) = \frac{1}{3}\pi r^2 h$ $4 (9^3 - r^3) = 14$ x 14 x $\frac{31}{7}$ $729 - r^3 = 217$ r = 7298 – 217 = 512 r = 8 cm d = 16 cm 	
Ans19	D = 2.4 cm R = 1.2 cm R- r = 0.2cm R = 1 cm 1 cm^3 = 11.41 kg Volume of Cu = $\pi h (R^2 - r^2)$ $= \frac{22}{7}$ x 3.5 $(1.2^2 - 1^2)$ = 11 x .21 = 2.31 cm^3	
Ans20	R = 8 cm 1cm^3 = 7.5gm Volume = 1/3 πx8^2 x 36 + π x 8^2 x 240 = π x 8^2 (12 + 240) = 252^{36}x 64 x 22/7 = 50688 cm^3 Cost = 50688 x 7.5 = 380160 9 m = 380.16 kg	
Ans21	Similar to answer 17	
Ans22	Let height of cylinder is h and radius of each is r ; then 2 r = 2/3 x total height of object 2 r = 2/3 (h+r) Br = 2 h + 2r 2r = h Volume = 2/3 + 2r 2r = h Volume = 2/3 π $r^3 + \pi r^2 h$ $\frac{1408}{21} = \pi r^2 \left(\frac{2r}{3} + h\right)$ $\frac{1408}{21} = \frac{22}{7} X$ $r^2 X \left(\frac{2r}{3} + \frac{2r}{1}\right)$ $\frac{1408}{21} = \frac{22}{7}$ x $\frac{8}{3} r^3$ $r^3 = 8$ r = 2 h = 4 cm	

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CLASS 10 SUBJECT Mathematics CHAPTER- 15 Probability

Ans1	B	1
Ans2	A	1
Ans3	A	
Ans4	D	
Ans5	B	
Ans6	a) $\frac{13+3}{52}=\frac{16}{52}=\frac{4}{13}$ b) $\frac{52-8}{52}\ \frac{44}{52}=\frac{11}{13}$	
Ans7	a) $\frac{6}{36}=\frac{1}{6}$ b) $\frac{36-6}{36}=\frac{30}{36}=\frac{5}{6}$	
Ans8	$\frac{52-(26+2}{52}=\frac{24}{52}=\frac{6}{13}$	
Ans9	Total out comes = 52 – (13+3) = 36 a) P(black fore card) = $\frac{3}{36}=\frac{1}{12}$ b) P (red card) = $\frac{35-2}{36}=\frac{24}{36}=\frac{2}{3}$	
Ans10	Let the no. of blue marbles be x ∴ the no. of green marbles = 24-x P (green) = $\frac{24-x}{24}=\frac{2}{3}$ x = 8	
Ans11	No. of white balls = x + 6 Total balls = 14+ 6 = 20 P (white) = $\frac{x+b}{20}=\frac{1}{2}$ x = 4	
Ans12	Let no., of blue balls be x Total balls = x + 5 P (blue) = (4 P (Red) $\frac{x}{x+5}=4\left(\frac{5}{x+5}\right)$ x = 20	
Ans13	a) x/18 b) No of red balls = x + 2 Total no. of balls = 18 + 2= 20 $\frac{x+2}{20}=\frac{9}{8}\times\frac{x}{18}$ x = 8	
Ans14	Total no. of balls = 5 + 6 + 7 = 18 a) 11/18 b) 7/18 c) 13/18	
Ans15	(HHH) , (HTN), (HHT), (HTT), (THH), (TNT), (TTH), (ITT) a) P (2H) = 3/8 b) P (at least 2H) = 4/8 = ½ c) P (at most 24) = 7/8	
Ans16	Total out come = 52-3 = 49 a) 3/49 b) 3/49 c) 23/49	
Ans17	a) 10/49 b) 3/49	

	c) 1 – 3/49 = 46/49	
Ans18	a) 8/19 b) 6/9	
Ans19	a) 5/17 b) 8/17 c) 13/17	
Ans20	a) 4/52 = 1/13 b) 26/52 = ½ c) 52/8/ 52 = 44/52 = 11/13 d) 2/51 = 1/26 e) 1- (13+3/52) = 36/52 = 9/13	
Ans21	a) 13/52 = ¼ b) 12/52 = 3/13 c) 1/52 d) 16/52 e) 16/52 f) 4/13	
Ans22	a) 20/100 = 1/5 b) 50/100 = ½ c) 10/100 = 1/10	
Ans23	a) 5/17 b) 8/17 c) 13/17	