

## Guess question for 10<sup>th</sup> Board Exam 2018(Jsunil Tutorial)

16. If the equation  $(1 + m^2 + 2mcx + (c^2 - a^2) = 0$  has equal roots, then show that  $c^2 = a^2(1 + m^2)$ .

17. A point P divides the line segment joining A(3, -5) and B(-4, 8) such that AP/PB = k : 1. If P lies on  $x + y = 0$  then find the value of k.

25. If  $S_1, S_2$  and  $S_3$  are the sum of n terms of three AP's, the first term of each being unity and the respective common difference being 1, 2, 3 prove that  $S_1 + S_3 = 2 S_2$ .

27. Solve for x :  $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$

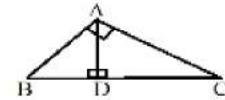
10. If  $\sec \theta + \tan \theta = p$ , then find the value of  $\sec \theta - \tan \theta$

20. Determine whether triangle having sides (a-1) cm,  $2\sqrt{a}$  cm and (a + 1) cm is a right angled triangle.

10. Prove that :  $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

20. If the polynomial  $x^4 + 2x^3 + 8x^2 + 12x + 18$  is divided by another polynomial  $x^2 + 5$ , the remainder comes out to be  $ax + b$ . Find the values of a and b.

12. In the Given figure,  $\angle BAC = 90^\circ$ ,  $AD \perp BC$ . If  $BD = 2$  cm and  $CD = 8$ cm, find AD.



13. Solve for x and y :  $\frac{x}{a} - \frac{y}{b} = a - b$  and  $ax + by = a^3 + b^3$

16. if  $x = a \sec \theta + b \tan \theta$  and  $y = a \tan \theta + b \sec \theta$  prove that  $x^2 - y^2 = a^2 - b^2$

17. Find the sum of first n terms of the series  $(4 - \frac{1}{n}) + (4 - \frac{2}{n}) + (4 - \frac{3}{n}) + \dots$

19. if  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $f(x) = 3x^2 + 5x - 2$  Find the value of  $\alpha^3 + \beta^3$

23. Solve the following system of linear equations graphically:  $2x + y + 6 = 0$  ;  $3x - 2y + 2 = 0$  Find the vertices of the triangle formed by the lines representing the above equations and x axis. Also find the area of the triangle so formed.

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24. If  $p$  times the  $p$ th term of an AP is equal to  $q$  times the  $q$ th term. Find the  $(p + q)$ th term of the A.P.

25. A man invested some amount at the rate of 10% simple interest and some other amount at the rate of 12% simple interest. He received yearly interest of Rs. 5000. But if he had interchanged the amounts invested, interest received would have been Rs. 100 less than in the earlier case. How much amount did he invest at different rates?

9. Find the ratio in which the point P ( $x, 2$ ) divides the line segment joining the points A(12, 5) and B (4, -3). Also, find the value of  $x$ .

10. BP and CQ are medians of  $\Delta ABC$  right angled at A. Prove that  $4 (BP^2 + CQ^2) = 5BC^2$

Q17. The base QR of an equilateral triangle PQR lies on X- axis. The coordinates of the point Q are (- 4, 0) and origin is the mid-point of the base. Find the coordinates of the point P and R.

Q22. If the points P(-3,9), Q(a,b) and R(4 , -5) are collinear and  $a + b = 1$  find the values of  $a$  and  $b$ .

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8. If the polynomial  $6x^4 + 8x^3 + 17x^2 + 21x + 7$  is divided by another polynomial  $3x^2 + 4x + 1$ , the remainder comes out to be ( $ax + b$ ), find  $a$  and  $b$

15. If 2 and - 3 are the zeroes of the quadratic polynomial  $x^2 + (a + 1)x + b$ , then find the values of  $a$  and  $b$ .

17. The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator are increased by 3, their ratio becomes 2:3. Determine the fraction.

12. If  $\operatorname{cosec} \theta = 3x$  and  $\cot \theta = 3/x$ , then find the value of  $x^2 - \frac{1}{x^2}$ .

21. A bag contains white, black and red balls only. A ball is drawn at random from the bag. The probability of getting a white ball is  $3/10$  and that of a black ball is  $2/5$ . Find the probability of getting a red ball .If the bag contains 20 black balls, find the total number of balls in the bag. <https://jsuniltutorial.weebly.com/>

5. For what value of  $k$  will  $k+9$ ,  $2k-1$  and  $2k+7$  are the consecutive terms of an AP?
10. Find the acute angle  $\theta$ , satisfying the equation  $\sec^2\theta - \tan^2\theta = 3$ .
11. The tops of two towers of height  $x$  and  $y$ , standing on level ground, subtend an angle of  $30^\circ$  and  $60^\circ$  respectively at the centre of the line joining their feet, then find  $x : y$ .
18. The probability of selecting a red ball at random from a jar that contains red, blue and orange balls is  $\frac{1}{4}$ . The probability of selecting a blue ball at random from the same jar is  $\frac{1}{3}$ . If the jar contains 10 orange balls, Find the total number of balls in the jar.
25. In an equilateral triangle  $ABC$ ,  $D$  is a point on side  $BC$  such that  $BD = \frac{1}{3} BC$ . Prove that  $9AD^2 = 7AB^2$ .
26. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/hr more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed.
21. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g. a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What is the value depicted by the students?
22. A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is  $60^\circ$ . From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is  $30^\circ$ . Find the height of the tower and the width of the canal.

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13. Prove that  $n^2 - n$  is divisible by 2 for every positive integer  $n$
15. Solve :  $a(x+y) + b(x-y) = a^2 - ab + b^2$  and  $a(x+y) - b(x-y) = a^2 + ab + b^2$

17. If  $m$  times the  $m$ th term of an AP is equal to  $n$  times its  $n$ th term, show that the  $(m+n)$ th term of the AP is zero.

18. 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped the second day, four more dropped the third day and so on. It takes eight more days to finish the work now. Find the number of days in which the work was completed.

19. Two pipes together can fill a tank in  $\frac{40}{13}$  minutes. The pipe of larger diameter takes 3 minutes less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

7. Find The ratio in which point  $(-3, K)$  divides the line segment joining the points  $(-5, -4)$  and  $(-2, 3)$ . Also find the value of  $K$ .

17. Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points  $A(2, -2)$  and  $B(3, 7)$ .

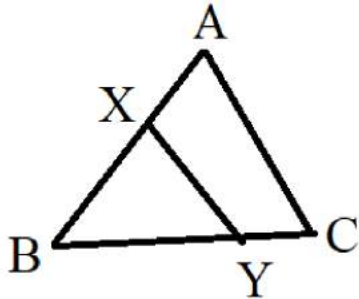
18. On a morning walk, three persons step off together and the steps measure 40cm, 42cm and 45cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

20. At present Asha's is two more than the square of her daughter Nisha's age. When Nisha grows to e her mother's present age, Asha's age would be one year less than ten times the present age of Nisha. Find the present ages of both Asha and Nisha.

21. The angle of elevation of the top of a tower from two points at a distance of ' $s$ ' and " $t$ " from its foot are complementary. Prove that the height of the tower is  $\sqrt{st}$

22. A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from  $30^\circ$  to  $45^\circ$ , find the time taken by the car to reach the tower.

23. In the given figure: the line segment  $XY \parallel AC$  of  $\Delta ABC$ , and it divides the triangle into two parts of equal area. Prove that  $AX:AB = (\sqrt{2} - 1) : \sqrt{2}$



23. Prove that :  $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$
- 24 If  $x = r \sin\alpha \cos\beta$  ,  $y = r \sin\alpha \sin\beta$  and  $z = r \cos\alpha$  then prove that  $r^2 = x^2 + y^2 + z^2$ .
- Q12. If  $\cos A + \cos^2 A = 1$ , then prove that  $\sin^2 A + \sin^4 A = 1$ .
13. Find the H.C.F. of 65 and 117 and express it in the form  $65m + 117n$ .
- 17.8 men and 12 boys can finish a piece of work in 10 days while 6 men and 8 boys can finish it in 14 days. Find the time taken by one man alone and that that by one boy alone to finish the work.
- 16 If the  $m$ th term of an A.P. is  $1/n$  and  $n$ th term is  $1/m$ , then show that its  $(mn)$ th term is 1.
17. Two poles of height  $a$  metres and  $b$  metres are  $p$  metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given by  $\frac{ab}{a+b}$  metres.
23. If  $\operatorname{cosec}\theta - \sin\theta = l$  and  $\sec\theta - \cos\theta = m$ , prove that  $l^2 m^2 (l^2 + m^2 + 3) = 1$ .
24. If  $\tan A = n \tan B$  and  $\sin A = m \sin B$ , Prove that  $\cos^2 A = \frac{m^2 - 1}{n^2 - 1}$ .
25. Find the zeroes of the polynomial  $f(x) = x^3 - 12x^2 + 39x - 28$ , if it is given that the zeroes are in A.P.
26. Prove that for any positive integer  $n$ ,  $n^3 - n$  is divisible by 6.
- Q27 .Find the values of  $a$  and  $b$  for which the following system of linear equations has infinite number of solutions:  $2x - 3y = 7$  and  $(a + b)x - (a + b - 3)y = 4a + b$

28. How many terms are identical in the two APs 2,4,6,8,...up to 100 terms and 6,9,...up to 80 terms?

30. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that  $\Delta ABC \sim \Delta PQR$ .

Q22. The perpendicular from A on side BC of  $\Delta ABC$  intersects BC at D such that  $DB = 3CD$  then Prove that  $2AB^2 = 2AC^2 + BC^2$

Q29. In an AP, the sum of first ten terms is  $-150$  and the sum of its next terms is  $-550$ . Find the AP?

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15. If the zeroes of the cubic polynomial  $x^3 - 6x^2 + 3x + 10$  are of the form  $a, a + b$  and  $a + 2b$  for some real numbers  $a$  and  $b$ . find the values of  $a$  and  $b$ .

25. If the first term of an AP is  $a$ , the second term is  $b$  and the last term is  $c$ , then show that the sum of the AP is equal to  $\frac{(a+c)(b+c-2a)}{2(b-a)}$

26. If  $s$  denotes the semi-perimeter of a  $\Delta ABC$  in which  $BC = a$ ,  $CA = b$  and  $AB = c$  and if a circle touches the sides  $BC$ ,  $CA$ ,  $AB$  at  $D$ ,  $E$ ,  $F$  respectively Prove that  $BD = s - b$ .

27. In  $\Delta PQR$ ,  $PD \perp QR$  such that  $D$  lies on  $QR$ . if  $PQ = a$ ,  $PR = b$ ,  $QD = c$  and  $DR = d$ . then prove that  $(a + b)(a - b) = (c + d)(c - d)$ .

**Above Questions are from PT test -2 (Mid Term Sep-2017) organized different school in India.**

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