ÉCOLE GLOBALE
INTERNATIONAL GIRLS' SCHOOL
Dehradun

HOLIDAY HOMEWORK **SUMMER BREAK 2018-19**
CLASS X CBSE **SUBJECT : MATHEMATICS**

Activity

Following lab manual activities in lab manual note book.
Activity no. 1 (HCF of two numbers)
Activity no. 2 (graph of quadratic polynomial)
Activity no. 3 (Area of circle by paper cutting and pasting) (page 51 of Lab Manual)
Activity no. 4 (To find the sum of first n natural numbers by activity)(page 22 of Lab Manual)

Project

1. Proof of Pythagoras theorem with the help of wooden model as discussed in class. Students have to bring the required materials to assemble the model in the school.
2. Mathematical design and patterns using arithmetic Progression. (You can take help from lab manual book (page no. 104-106)

1 Write whether every positive integer can be of the form $4q + 2$, where q is an integer. Justify your answer.

2 "The product of two consecutive positive integers is divisible by 2". Is this statement true or false? Give reasons.

3 "The product of three consecutive positive integers is divisible by 6". Is this statement true or false"? Justify your answer.

4 Write whether the square of any positive integer can be of the form $3m + 2$, where m is a natural number. Justify your answer.

5 A positive integer is of the form $3q + 1$, q being a natural number. Can you write its square in any form other than $3m + 1$, i.e., $3m$ or $3m + 2$ for some integer m? Justify your answer.

6 Show that the square of an odd positive integer is of the form $8m + 1$, for some whole number m.

7 Show that the square of any positive integer is either of the form $4q$ or $4q + 1$ for some integer q.

8 Show that cube of any positive integer is of the form $4m$, $4m + 1$ or $4m + 3$, for some integer m.

9 Show that the square of any positive integer cannot be of the form $5q + 2$ or $5q + 3$ for any integer q.

10 . Show that the square of any positive integer cannot be of the form $6m + 2$ or $6m + 5$ for any integer m.

11 Using Euclid's division algorithm to show that any positive odd integer is of the form 4q+1 or 4q+3, where q is some integer.

12 Use Euclid's division algorithm to find the HCF of 441, 567, 693.

13 Using Euclid's division algorithm, find the largest number that divides 1251, 9377 and 15628 leaving remainders 1, 2 and 3, respectively.

14 Using Euclid's division algorithm, find which of the following pairs of numbers are co-prime: (i) 231, 396 (ii) 847, 2160

15 Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

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

17 If LCM (480, 672) = 3360, find HCF (480,672).

18 Express 0.69 as a rational number in $\frac{p}{q}$ form.

19 Show that the number of the form 7^n, $n \in N$ cannot have unit digit zero.

20 Using Euclid's Division Algorithm find the HCF of 9828 and 14742.

21 The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is HCF (525, 3000)? Justify your answer.

22 Explain why $3 \times 5 \times 7 + 7$ is a composite number.

23 Can two numbers have 18 as their HCF and 380 as their LCM? Give reasons.

24 Without actual division find whether the rational number $\frac{1323}{\left(6^3 \times 35^2\right)}$ has a terminating or a non-terminating decimal.

25 Three tankers contain 403 litres, 434 litres and 465 litres of diesel respectively. Find the maximum capacity of a container that can measure the diesel of the three containers exact number of times.

26 Find the least number which when divided by 6, 15 and 18 leave remainder 5 in each case.

27 Find the smallest 4-digit number which is divisible by 18, 24 and 32.

28 Renu purchases two bags of fertiliser of weights 75 kg and 69 kg. Find the maximum value of weight which can measure the weight of the fertiliser exact number of times.

29 In a seminar, the number, the number of participants in Hindi, English and Mathematics are 60, 84 and 108, respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

30 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and is to contain cartons of the same drink, what would be the greatest number of cartons each stack would have?

31 A merchant has 120 litres of oil of one kind, 180 litres of another kind and 240 litres of third kind. He wants to sell the oil by filling the three kinds of oil in tins of equal capacity. What would be the greatest capacity of such a tin?

32 Prove that $15+17\sqrt{3}$ is an irrational number.

33 Prove that $\dfrac{2\sqrt{3}}{5}$ is an irrational number.

34 Prove that $7+3\sqrt{2}$ is an irrational number.

35 Prove that $2+3\sqrt{5}$ is an irrational number.

36 Prove that $\sqrt{2}+\sqrt{3}$ is an irrational number.

37 Prove that $\sqrt{3}+\sqrt{5}$ is an irrational number.

38 Prove that $7-2\sqrt{3}$ is an irrational number.

39 Prove that $3-\sqrt{5}$ is an irrational number.

40 Find all the zeroes of the polynomial x^3+3x^2-2x-6, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

41 Find all the zeroes of the polynomial $2x^3-x^2-5x-2$, if two of its zeroes are -1 and 2.

42 Find all the zeroes of the polynomial $x^3+3x^2-5x-15$, if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$.

43 Find all the zeroes of the polynomial $x^3-4x^2-3x+12$, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

44 Find all the zeroes of the polynomial $2x^3+x^2-6x-3$, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

45 Find all the zeroes of the polynomial $x^4+x^3-34x^2-4x+120$, if two of its zeroes are 2 and -2.

46. Find the zeroes of the following polynomials by factorisation method and verify the relations between the zeroes and the coefficients of the polynomials:

(i) $4x^2 - 3x - 1$

(ii) $3x^2 + 4x - 4$

(iii) $5t^2 + 12t + 7$

(iv) $t^3 - 2t^2 - 15t$

(v) $2x^2 + \frac{7}{2}x + \frac{3}{4}$

(vi) $4x^2 + 5\sqrt{2}x - 3$

(vii) $2s^2 - (1 + 2\sqrt{2})s + \sqrt{2}$

(viii) $v^2 + 4\sqrt{3}v - 15$

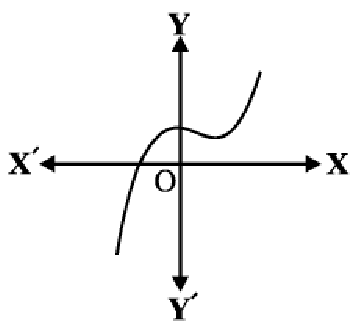
47 Obtain all the zeroes of $3x^4+6x^3-2x^2-10x+5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

48 Obtain all the zeroes of $x^4-7x^3+17x^2-17x+6$, if two of its zeroes are 3 and 1.

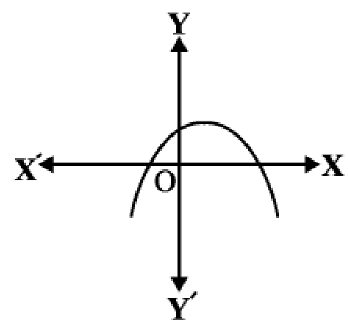
49 Obtain all the zeroes of x^4-7x^2+12, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

50 Two zeroes of the cubic polynomial ax^3+3x^2-bx-6 are -1 and -2. Find the 3rd zero and value of a and b.

51 Find the number of zeroes in each of the following:



(i)



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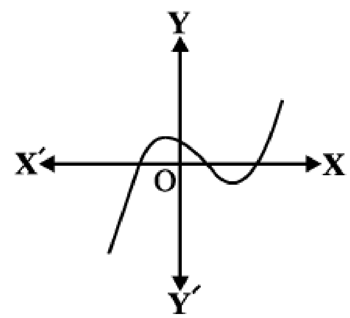

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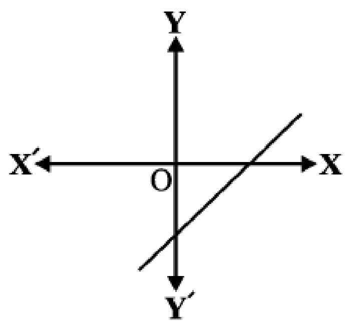

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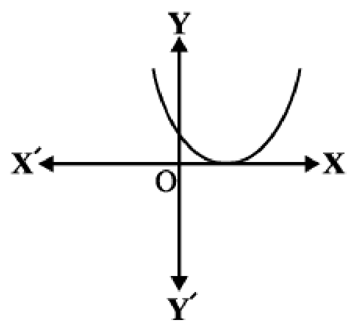

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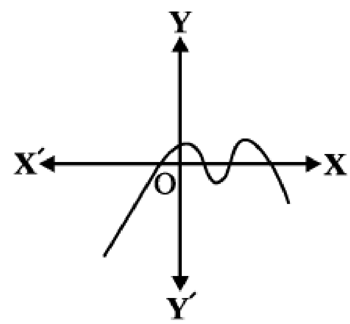

(vi)

52 If α and β are the zeroes of the quadratic polynomial $f(x) = 6x^2 + x - 2$, then find the value of

$(i)\, \alpha-\beta$ $(ii)\, \alpha^2+\beta^2$ $(iii)\, \alpha^4+\beta^4$ $(iv)\, \alpha\beta^2+\alpha^2\beta$

$(v)\, \frac{1}{\alpha}+\frac{1}{\beta}$ $(vi)\, \frac{1}{\alpha}+\frac{1}{\beta}-\alpha\beta$ $(vii)\, \frac{1}{\alpha}-\frac{1}{\beta}$ $(viii)\, \alpha^3+\beta^3$

$(ix)\, \frac{\alpha}{\beta}+\frac{\beta}{\alpha}$ $(x)\, \frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}$ $(xi)\, \frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)+3\alpha\beta$

53 If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 2x + 3$, then find a quadratic polynomial whose zeroes are $\alpha + 2$ and $\beta + 2$

54 If α and β are the zeroes of the quadratic polynomial $f(x) = 3x^2 - 4x + 1$, then find a quadratic polynomial whose zeroes are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$.

55 If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 2x + 3$, then find a quadratic polynomial whose zeroes are $\frac{\alpha - 1}{\alpha + 1}$ and $\frac{\beta - 1}{\beta + 1}$.

56 If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - p(x + 1) - c$, show that $(\alpha + 1)(\beta + 1) = 1 - c$.

57 If α and β are the zeroes of the quadratic polynomial such that $\alpha + \beta = 24$ and $\alpha - \beta = 8$, find a quadratic polynomial having α and β as its zeroes.

58 If sum of the squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, find the value of k.

59 $11x + 15y + 23 = 0;\ 7x - 2y - 20 = 0.$

60 $2x + y = 7;\ 4x - 3y + 1 = 0.$

61 $23x - 29y = 98;\ 29x - 23y = 110.$

62 $2x + 5y = \frac{8}{3};\ 3x - 2y = \frac{5}{6}.$

63 $4x - 3y = 8;\ 6x - y = \frac{29}{3}.$

64 $2x - \frac{3}{4}y = 3;\ 5x = 2y + 7.$

65 $\frac{5}{x} + 6y = 13; \quad \frac{3}{x} + 4y = 7, \quad x \neq 0$

66 $\frac{2}{x} + \frac{3}{y} = \frac{9}{xy}; \quad \frac{4}{x} + \frac{9}{y} = \frac{21}{xy} \quad (x \neq 0, y \neq 0)$

67 $\frac{5}{x} - \frac{3}{y} = 1; \quad \frac{3}{2x} + \frac{2}{3y} = 5 \quad (x \neq 0, y \neq 0)$

68 $\frac{1}{7x} + \frac{1}{6y} = 3; \quad \frac{1}{2x} - \frac{1}{3y} = 5 \quad (x \neq 0, y \neq 0)$

69 $\frac{5}{x+1}-\frac{2}{y-1}=\frac{1}{2};\quad \frac{10}{x+1}+\frac{2}{y-2}=\frac{5}{2},\ x\neq -1\ \ and\ \ y\neq 1.$

70 $\frac{3}{x+y}+\frac{2}{x-y}=2;\quad \frac{9}{x+y}-\frac{4}{x-y}=1,\quad x+y\neq 0\ \ and\ \ x-y\neq 0.$

71 $\frac{57}{x+y}+\frac{6}{x-y}=5;\quad \frac{38}{x+y}+\frac{21}{x-y}=9,\quad x+y\neq 0\ \ and\ \ x-y\neq 0.$

72 $\frac{b}{a}x+\frac{a}{b}y=a^2+b^2; x+y=2ab$

73 $ax+by=a-b; bx-ay=a+b$.

74 $\frac{b^2x}{a}+\frac{a^2y}{b}=ab(a+b); b^2x+a^2y=2a^2b^2$

75 $2(ax-by)+(a+4b)=0; 2(bx+ay)+(b-4a)=0$

76 $(a-b)x+(a+b)y=a^2-2ab-b^2; (a+b)(x+y)=a^2+b^2$

77 $\frac{x}{a}+\frac{y}{b}=a+b; \frac{x}{a^2}+\frac{y}{b^2}=2$

78 $\frac{ax}{b}-\frac{by}{a}=a+b;\ \ ax-by=2ab.$

79 Find the value of k, so that the following system of equations has no solution:

$3x - y - 5 = 0; 6x - 2y - k = 0.$

80 Find the value of k, so that the following system of equations has a non-zero solution:

$3x + 5y = 0; kx + 10y = 0.$

81 Find the value of k, so that the following system of equations has no solution:

$3x+y=1;\quad (2k-1)x+(k-1)y=(2k-1).$

$3x+y=1;\quad (2k-1)x+(k-1)y=(2k+1).$

$x-2y=3;\quad 3x+ky=1.$

$x+2y=5;\quad 3x+ky+15=0.$

$kx+2y=5;\quad 3x-4y=10.$

$x+2y=3;\quad 5x+ky+7=0.$

82 Solve the following system of linear equations graphically: $2x-3y-17=0$; $4x+y-13=0$. Shade the region bounded by the above lines and x-axis.

83 Solve the following system of linear equations graphically: $2x+3y=4$; $3x-y=-5$. Shade the region bounded by the above lines and y-axis.

84 Solve the following system of linear equations graphically: $4x-y=4$; $3x+2y=14$.. Shade the region bounded by the above lines and y-axis.

85 Solve the following system of linear equations graphically: $x+2y=5$; $2x-3y=-4$.. Shade the region bounded by the above lines and y-axis.

86 Draw the graphs of the equations $4x-y-8=0$; $2x-3y+6=0$. Also determine the vertices of the triangle formed by the lines and x-axis.

87 The sum of the digits of a two digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Find the number.

88 Seven times a two-digit number is equal to four times the number obtained by reversing the order of its digit. If the difference between the digits is 3, then find the number.

89 The sum of the digits of a two digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

90 The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the numbers get reversed. Find the number.

91 The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

92 A two-digit number is 4 more than 6 times the sum of its digit. If 18 is subtracted from the number, the digits are reversed. Find the number.

93 A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km down-stream. Determine the speed of the stream and that of the boat in still water.

94 A man travels 370 km partly by train and partly by car. If he covers 250 km by train and the rest by car, it takes him 4 hours. But if he travels 130 km by train and the rest by car, he takes 18 minutes longer. Find the speed of the train and that of the car.

95 A boat covers 32 km upstream and 36 km downstream in 7 hours. In 9 hours, it can cover 40 km upstream and 48 km down-stream. Find the speed of the stream and that of the boat in still water.

96 Two places A and B are 120 km apart on a highway. A car starts from A and another from B at the same time. If the cars move in the same direction at different speeds, they meet in 6 hours. If they travel towards each other, they meet in 1 hours 12 minutes. Find the speeds of the two cars.

97 2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work, and also that taken by 1 man alone.

98 8 men and 12 boys can finish a piece of work in 10 days while 6 men and 8 boys finish it in 14 days. Find the time taken by one man alone and by one boy alone to finish the work.

99 8 men and 12 boys can finish a piece of work in 5 days while 6 men and 8 boys finish it in 7 days. Find the time taken by 1 man alone and by 1 boy alone to finish the work.