

MATHS WORKSHEET

Class X

Chapter - 1, 2, 3, 6, 8, 14

- Q1 → (i) Show that any positive odd integer is of the form $8q+1$, or $8q+3$ or $8q+5$ or $8q+7$, where q is some integer.
(ii) Show that the square of any positive odd integer is of the form $8m+1$ for some integer m .
- Q2 → Find the greatest integer which on dividing 398, 436 and 542 leaves the remainders 7, 11 and 15 respectively.
- Q3 → Using Fundamental Theorem of Arithmetic, find the HCF of 26, 51 and 91.
- Q4 → The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, write the other number.
- Q5 → Prove that $\sqrt{3} + \sqrt[3]{2}$ is irrational.
- Q6 → Check whether $\frac{51}{1500}$ has a terminating decimal expansion or a non-terminating repeating decimal expansion.
- Q7 → The decimal expansion of irrational number $\frac{43}{2^4 \cdot 5^3}$, will terminate after how many places of decimals?
- Q8 → Write the polynomial, the product and sum of whose zeroes are $-\frac{13}{5}$ and $-\frac{3}{5}$.
- Q9 → If one zero of polynomial $p(x) = 3x^2 - 8x + 2k + 1$ is seven times the other, then find the zeroes and value of k .
- Q10 → Find the zeroes of quadratic polynomial $5x^2 - 4 - 8x$ and verify the relationship between the zeroes and their coefficients.

Q11 → For what value of p is $x^2 - 2x - (7p + 3)$ a perfect square polynomial?

$$x^2 - 2x - (7p + 3) ?$$

Q12 → If α, β, γ are zeroes of cubic polynomial $6x^3 + 3x^2 - 5x + 1$, then find the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$.

Q13 → Verify that $\frac{1}{2}, 1, -2$ are zeroes of cubic polynomial $2x^3 + x^2 - 5x + 2$. Also verify the relationship between the zeroes and coefficients.

Q14 → Write a quadratic polynomial whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$.

Q15 → Give examples of polynomials $p(x), g(x), q(x)$ and $r(x)$, which satisfy the Division Algorithm and

$$(i) \deg p(x) = \deg q(x)$$

$$(ii) \deg q(x) = \deg r(x)$$

$$(iii) \deg r(x) = 0.$$

Q16 → If the polynomial $x^4 - 3x^2 + 5x + 3$ is divisible by $x^2 - 2$, the remainder is $ax + b$. What will be the quotient? Also find the values of 'a' and 'b'.

Q17 → Find the value of 'a' so that the point $(3, a)$ lies on the line represented by $2x - 3y = 5$.

Q18 → Solve the following system of equations graphically:
 $2(x-1) = y$ and $x+3y = 15$

Also, find the coordinates of the points where the lines meet the axis of y.

Q19 → Graphically, solve the following system of equations:
 $4x - 3y + 4 = 0$ and $4x + 3y - 20 = 0$

Find the area of region bounded by these lines and the x-axis.

Q10 → Determine whether the pair of linear equation is inconsistent:

$$\begin{aligned} kx + 3y &= k - 2 \\ 12x + ky &= k \end{aligned}$$

Q11 → Find the values of 'a' and 'b' for which the following pair of linear equations has an infinite number of solutions:

$$\begin{aligned} 2x + 3y &= 7 \\ (a-b)x + (a+b)y &= 3a+b-2 \end{aligned}$$

Q12 → Using cross-multiplication method, solve the following pair of equations:

$$\frac{ax}{b} - \frac{by}{a} = a+b$$

$$ax - by = 2ab$$

Q13 → Solve the following pair of linear equations for x and y:

$$47x + 31y = 63$$

$$31x + 47y = 15$$

Q14 → Solve the following pair of linear equations by cross-multiplication method:

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

$$b^2x - a^2y = 2a^2b^2$$

Q15 → A man sold a table and a chair together for ₹ 850 at a loss of 10% on the table and a gain of 10% on the chair.

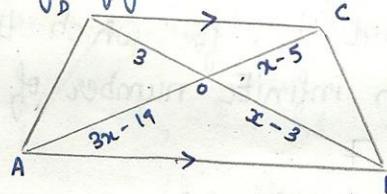
By selling them together for ₹ 950, he would have made a gain of 10% on the table and a loss of 10% on the chair.

Find the cost price of each.

Q16 → A man walks a certain distance with a certain speed. If he walks $\frac{1}{2}$ km an hour faster, he takes 1 hour less. But if he walks 1 km an hour slower, he takes 3 hours more. Find the distance covered by the man and his original rate of walking.

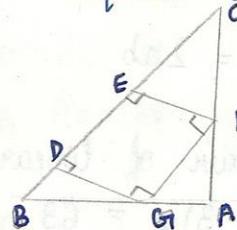
Q27 → The diagonals of a quadrilateral ABCD intersects each other at point O such that $\frac{AO}{BO} = \frac{CO}{DO}$. Show that ABCD is a trapezium.

Q28 → In the adjoining figure, determine the value of x .

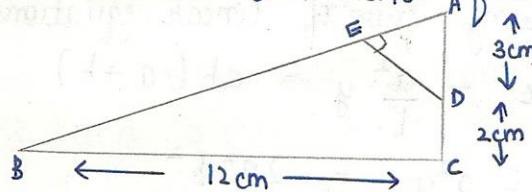


Q29 → In a $\triangle ABC$ if $DE \parallel BC$ and $BD = CE$. Prove that $\triangle ABC$ is isosceles.

Q30 → In the figure, DEFG is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.



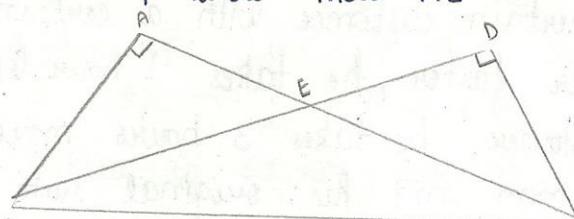
Q31 → In the figure, $\triangle ABC$ is right angled at C and $DE \perp AB$. Prove that $\triangle ABC \sim \triangle ADE$ and hence find length of AE and DE.



Q32 → Sides AB and AC and median AD of a $\triangle ABC$ are proportional to the sides PQ and PR and median PM of a $\triangle PQR$. Prove that

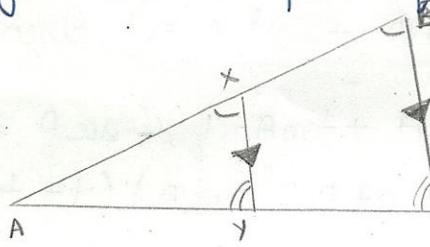
$\triangle ABC \sim \triangle PQR$. If you are the only student who could work out this proof notes to them for copying or will you explain the proof to them?

Q33 → Two triangles ABC and DBC are on the same base BC and on some side of BC in which $\angle A = \angle D = 90^\circ$. If CA and BD meet each other at E, show that $AE \cdot EC = BE \cdot ED$.

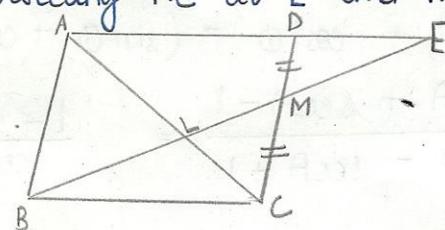


Q34 → In figure, ΔABC is right-angled at C . A line BX is drawn parallel to AC from B such that X lies on AB . If $BC = 1$, prove that the side BC of ΔABC and it divides the triangle into two parts of equal areas.

$$\text{Prove that } \frac{BX}{AB} = \frac{\sqrt{2}-1}{\sqrt{2}}$$



Q35 → In the figure, M is mid-point of side CD of a parallelogram $ABCD$. The line BM is drawn intersecting AC at L and AD produced at E . Prove that $EL = 2BL$



Q36 → In ΔABC , if AD is the median, show that $AB^2 + AC^2 = 2(AD^2 + BD^2)$

$$AB^2 + AC^2 = 2(AD^2 + BD^2)$$

Q37 → A triangle ABC is right-angled at B . Side BC is trisected at points D and E . Prove that $BAE^2 = 3AC^2 + 5AD^2$.

Q38 → ABC is a triangle, right-angled at C . If p is the length of perpendicular from C to AB and $AB = \sqrt{c}$, $BC = a$ and $CA = b$. Show that (i) $p^2 = ab$ and (ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

Q39 → Prove that the area of an equilateral triangle on the hypotenuse of a right-angled triangle is equal to the sum of areas of equilateral triangles on the other two sides.

Q40 → If $\operatorname{cosec} A = \sqrt{2}$, find the value of $\frac{1}{\tan A} + \frac{\sin A}{1 + \cos A}$

Q41 → If $3 \cot \phi = 4$, find the value of $\frac{5 \sin \phi - 3 \cos \phi}{5 \sin \phi + 3 \cos \phi}$.

Q42 → Evaluate: $\frac{11 \sin 70^\circ}{7 \cos 20^\circ} - \frac{4}{7} \frac{\cos 53^\circ \operatorname{cosec} 37^\circ}{\tan 15^\circ \tan 35^\circ \tan 35^\circ \tan 75^\circ}$

Q43 → Without using trigonometrical tables, evaluate:

$$(i) \frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\tan 35^\circ \tan 55^\circ \tan 71^\circ \tan 11^\circ}$$

$$(ii) \frac{2}{3} \csc^2 50^\circ - \frac{2}{3} \cot 58^\circ \tan 32^\circ - \frac{5}{3} \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$$

Q44 → If $\sin \phi + \sin^2 \phi = 1$, then prove $\cos^2 \phi + \cos^4 \phi = 1$

Q45 → (i) $(\sec A + \tan A - 1)(\sec A - \tan A + 1) - 2 \tan A = 0$

$$(ii) (1 + \cot A - \csc A)(1 + \tan A + \sec A) = 2$$

$$(iii) \sec^2 \phi - \frac{\sin^2 \phi - 2 \sin^4 \phi}{2 \cos^4 \phi - \cos^2 \phi} = 1$$

$$(iv) \sin^3 \phi + \cos^3 \phi = (\sin \phi + \cos \phi)(1 - \sin \phi \cos \phi)$$

$$(v) \frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$$

Q46 → If $\tan \phi + \sin \phi = m$ and $\tan \phi - \sin \phi = n$, then show that $m^2 - n^2 = 4 \sqrt{mn}$.

Q47 → Evaluate: $\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 2 \csc^2 58^\circ - 2 \cot 58^\circ \tan 32^\circ - 4 \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$

Q48 → The mean of following frequency distribution is 57.6 and the sum of observations is 50. Find missing frequencies f_1 and f_2 .

Class	0-20	20-40	40-60	60-80	80-100	100-120
frequency	7	f_1	12	f_2	8	5

Q49 → The mean of following frequency distribution is 50. Find missing frequency f_1 .

Class	0-20	20-40	40-60	60-80	80-100
frequency	6	8	6	f	5

Q50 → The following table gives the life of 50 bulbs:

Life time (in hours)	0-100	100-200	200-300	300-400	400-500
No. of bulbs	5	12	14	6	13

Calculate the modal life of the bulbs.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

Q52 → Form an ordinary frequency table from the following cumulative frequency distribution and calculate the mean.

(i)

Class	Frequency
Below 100	0
Below 150	24
Below 200	64
Below 250	97
Below 300	125
Below 350	155
Below 400	177
Below 450	197
Below 500	200

(ii)

Marks	No. of Students
Above 0	80
Above 10	76
Above 20	71
Above 30	65
Above 40	57
Above 50	43
Above 60	28
Above 70	15
Above 80	10
Above 90	8
Above 100	0

Q53 → Which point of intersection of the "more than ogive" and "less than ogive"?

Q54 → The frequency distribution given below shows the marks in mathematics obtained by 100 students in a class:

Marks	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of Students	8	10	25	31	11	12	2	1

Draw the ogives (both less than and more than) for this distribution and use it to determine the median.

Q55 → The following are the marks obtained by 50 students in statistics:

Marks	No. of Students
10 marks or less	4
20 marks or less	10
30 marks or less	30
40 marks or less	40
50 marks or less	47
60 marks or less	50

Draw a less than ogive and find out the median. Also, calculate the median by the direct formula.