

Q.2. Write the following quadratic equations in standard form :

(i) $x + 3x^2 + 8 = 0$

(vi) $x^2 - 4x = 0$

(ii) $(x - 5)(x + 4) = 5$

(v) $-x^2 + 8x - 3 = 6$

(iii) $x + \frac{1}{x} = 8$

(vi) $(x + 3)(x + 1) = 2$

Task-3: Solving a quadratic equation by factorization

Topic	Quadratic equations
Nature of task	Content
Content Coverage	Solution of a quadratic equation
Learning Objectives	To learn to find solution of a quadratic equation by factorization method
Task	Find the roots
Execution of task	To be done in the classroom. Teacher may write some equations on board and ask students to factorize quadratic polynomial on the left side of equation (done earlier in class 9)
Duration	1 period
Criteria for assessment	It is a part of regular C.W. assessment.
Follow up	Discussion and explanation in classroom followed by assignment to be done at home independently

Worksheet-2

Q.1. Find the roots of the following quadratic equations using factorizations:

(i) $x^2 + 5x + 6 = 0$

(vi) $2x^2 + 9x - 56 = 0$

(ii) $x^2 + 7x + 12 = 0$

(vii) $3x^2 + 14x - 5 = 0$

(iii) $x^2 - 12x + 35 = 0$

(viii) $x - \frac{1}{x} = -2$

(iv) $x^2 - 64 = 0$

(ix) $x^2 + 7x = 0$

(v) $x + \frac{20}{x} = -9$

(x) $3x^2 - 5x = 0$



Task-4: Solving a quadratic equation by completing the square method

Topic	Quadratic equations
Nature of task	Content
Content Coverage	Solution of a quadratic equation
Learning Objectives	To learn to find solution of a quadratic equation by completing the square method
Task	Find the roots of given quadratic equations.
Execution of task	To be done in the classroom.
	After explaining the method, teacher may write some equations on board and ask students to find roots of given quadratic equation by completing the square method.
Duration	3 periods
Criteria for assessment	It is a part of regular C.W. assessment.
Follow up	Discussion and explanation in classroom.

Remember : If $x^2 = m$ then $x = \pm\sqrt{m}$

Solve for x :

$$x^2 = 9$$

$$x^2 = 17$$

$$x^2 = 25$$

$$x^2 = 16$$

$$x^2 - 100 = 0$$

$$(x - 3)^2 + 5 = 12$$

Remember : The square root property cannot be directly applied in a quadratic that has a middle term such as $x^2 + 5x + 16$

In such a case we use completing the square method.

Example 1: $x^2 + 2x - 5 = 0$

$$a = 1, b = 2, c = -5, (b/2)^2 = 1$$

$$x^2 + 2x + 1 - 1 - 5 = 0$$

Adding and subtracting $(b/2)^2 = 1$

$$(x + 1)^2 - 6 = 0$$

$$(x + 1)^2 = 6$$

$$x + 1 = \sqrt{6} \quad \text{or} \quad x + 1 = -\sqrt{6}$$

$$x = -1 + \sqrt{6} \quad \text{or} \quad x = -1 - \sqrt{6}$$



Worksheet – 3

Showing Quadratic Equation using Quadratic formula

Quadratic Equations	a	b	c	$b^2 - 4ac$	$b^2 - 4ac > 0$	$b^2 - 4ac > 0$	$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	Nature of root
$x^2 + 4x + 5 = 0$									
$3x^2 - 5x + 2 = 0$									
$x^2 + 2x - 143 = 0$									
$x^2 - 5x + 6 = 0$									
$9x^2 + 3x + 5 = 0$									
$5x^2 - 6x + 2 = 0$									
$5x^2 - 6x - 2 = 0$									
$3x^2 - 5x + 2 = 0$									



Task-6: Home Assignment

Topic	Quadratic equations
Nature of task	Post Content
Content Coverage	Complete Chapter
Learning Objectives	Mentioned earlier
Task	Home Assignment
Execution of task	To be done by students at home.
Duration	2 days
Criteria for assessment	It is a part of regular H.W. assessment.
Follow up	Suggest correction work to students (if any)

Home Assignment

- What do you understand by root / solution of a quadratic equation ?
- Which of the following is not a quadratic equation:
 - $2x^2 - 5x + 2 = 0$
 - $3x^2 - 7x + 2 = 0$
 - $3x^2 + 2x + 5$
 - $x + \frac{1}{x} = 5$
- If $x^2 + 5x + 1 = 0$, find the value of $x + \frac{1}{x}$
- Solve for x : $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$
- Solve for x : $36x^2 - 12ax + 1(a^2 - b^2) = 0$
- Solve for x : $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 3$; $(x \neq 1, x \neq -2)$
- Solve for x : $\frac{1}{x+1} + \frac{1}{x+5} = \frac{1}{x+2} + \frac{1}{x+4}$, $(x \neq -1, x \neq -4, x \neq -5, x \neq -2)$
- Solve for x : $16.4^{(x+2)} - 16.2^{(x+1)} + 1 = 0$
- Solve x : $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5$



10. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$
11. If $\sin \alpha$ and $\cos \alpha$ are roots of the equation $ax^2 + bx + c = 0$, prove that $a^2 - b^2 + 2ac = 0$.
12. The sum of the reciprocals of the consecutive natural nos. is $\frac{23}{132}$. Find the numbers.
13. If a train travels 15 km/hour faster, it would take 1 hour less to travel 180 km. Find the original speed of the train.

Task-7: MCQ

Topic	Quadratic equations
Nature of task	Post Content
Content Coverage	Whole Chapter
Learning Objectives	Mentioned earlier
Task	MCQ Worksheet
Execution of task	Teacher may give printed worksheet in the class room. It is not necessary to allot marks to this task. Answers to questions can be discussed at the end.
Duration	1 period
Criteria for assessment	Follow rubric classwork assessment.
Follow up	Discussion after the test.

MCQ Worksheet

1. The value of k for which equation $9x^2 + 8kx + 8 = 0$ has equal roots is:
 (A) Only 3 (B) Only -3 (C) ± 3 (D) 9
2. Which of the following is not a quadratic equation ?
 (A) $x - \frac{3}{x} = 3$ (B) $3x - \frac{5}{x} = x^2$
 (C) $x + \frac{1}{x} = 3$ (D) $x^2 - 3 = 4x^2 - 4x$
3. Which of the following is a solution of the quadratic equation $2x^2 + x - 6 = 0$?
 (A) $x = 2$ (B) $x = -12$ (C) $x = \frac{3}{2}$ (D) $x = -3$



4. The value of k for which $x = -2$ is a root of the quadratic equation $kx^2 + x - 6 = 0$
- (A) -1 (B) -2 (C) 2 (D) $-\frac{3}{2}$
5. The value of p so that the quadratic equation $x^2 + 5px + 16 = 0$ has no real root, is
- (A) $p > 8$ (B) $p < 5$
- (C) $\frac{-8}{5} < x < \frac{8}{5}$ (D) $\frac{-8}{5} \leq x < 0$
6. If $px^2 + 3x + q = 0$ has two roots $x = -1$ and $x = -2$, the value of $q - p$ is :
- (A) -1 (B) 1 (C) 2 (D) -2
7. The common root of the quadratic equation $x^2 - 3x + 2 = 0$ and $2x^2 - 5x + 2 = 0$ is :
- (A) $x = 2$ (B) $x = 1$ (C) $x = -2$ (D) $x = \frac{1}{2}$
8. If $x^2 - 5x + 1 = 0$, the value of $\left(x + \frac{1}{x}\right)$ is :
- (A) -2 (B) -5 (C) 5 (D) 3
9. If $a - 3 = \frac{10}{a}$, the value of a are
- (A) $5, 0$ (B) $5, 2$ (C) $-5, 2$ (D) $5, -2$
10. If the roots of the quadratic equation $kx^2 + (a + b)x + ab = 0$ are $(-1, -b)$, the value of k is :
- (A) -1 (B) 1 (C) 2 (D) -2
11. The quadratic equation with real co-efficients whose one root is $2 + \sqrt{3}$ is :
- (A) $x^2 - 2x + 1 = 0$ (B) $x^2 - 4x + 1 = 0$
- (B) $x^2 - 4x + 3 = 0$ (D) $x^2 - 4x + 4 = 0$
12. If the difference of roots of the quadratic equation $x^2 + kx + 12 = 0$ is 1, the positive value of k is :
- (A) -7 (B) 7 (C) 4 (D) 8



Task-8: Remedial Worksheet

Topic	Quadratic equations
Nature of task	Neet based
Content Coverage	Recognising Quadratic equation and quadratic polynomial. <ul style="list-style-type: none"> Solving quadratic equation using quadratic formula Method of completing square Calculation error
Execution of task	Teacher may give printed worksheet.
Duration	Individual based
Criteria for assessment	It is not necessary to give marks.
Follow up	Similar questions may be given for practise.

Remedial Task (1)

Quadratic Equations	Quadratic Polynomial
$2x^2 + 3x - 2 = 0$	$2x^2 + 3x - 2$
$4x^2 + 2x - 5 = 0$	$4x^2 + 2x - 5$

Understand the difference between a quadratic equation and a quadratic polynomial. Separate quadratic equations and quadratic polynomials from the given box into two boxes given below :

$3x^2 - 2x + \frac{1}{3}$ $3x^2 - 4\sqrt{3}x + 4$
 $4x^2 - 3x + 7 = 0$ $2x^2 - 5x + 6 = 0$
 $2x^2 + x - 4$ $5x^2 - 2x + 7$ $4x^2 - 3\sqrt{2}x + 7 = 0$
 $9x^2 + 3x - 7$ $2x^2 - 3x + 2 = 0$
 $2x^2 + x + 4 = 0$ $4x^2 - 3x + 2$

Quadratic Equations

Quadratic Polynomial



Remedial Task (2)

1. A quadratic equation in the variable x is an equation of the form $ax^2 + bx + c = 0$, where a, b, c are real numbers, $a \neq 0$.
2. *Discriminant* : $D = b^2 - 4ac$
3. A quadratic equation $ax^2 + bx + c = 0$ has
 - (i) two distinct real roots, if $D > 0$
 - (ii) two equal real roots, if $D = 0$
 - (iii) no real roots, if $D < 0$
4. Roots are given by $x = \frac{-b \pm \sqrt{D}}{2a}$

Example : Find the nature of roots of given quadratic equation of real roots exist, find them:

(I) $2x^2 - 3x + 5 = 0$

Here, $a =$ _____

$b =$ _____

$c =$ _____

$D = b^2 - 4ac =$ _____

Find nature of roots _____

Find real roots (if any).

Compare it with

$ax^2 + bx + c = 0$

(II) $2x^2 - 6x + 3 = 0$

$a =$, $b =$, $c =$

$D = b^2 - 4ac =$

Is $D = 0$

$D < 0$

$D > 0$

Find real roots (if any).



(III) $3x^2 - 2x + \frac{1}{3} = 0$

$a = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}, c = \underline{\hspace{2cm}}$

$D = \underline{\hspace{4cm}}$

$= \underline{\hspace{4cm}}$

$= \underline{\hspace{4cm}}$

Nature of roots $\underline{\hspace{4cm}}$

Real roots (if any) $\underline{\hspace{4cm}}$

Remedial Task (3)

Method of Completing the Square

(a) $2x^2 - 7x + 3 = 0$

Divide the whole equation by 2, we get

$$x^2 - \frac{7}{2}x + \frac{3}{2} = 0$$

$$(x)^2 - 2(x)(\quad) + (\quad)^2 - (\quad)^2 + \frac{3}{2} = 0$$

$$(x - \square)^2 = \square^2 - \frac{3}{2}$$

Simplyfy.

Use $(a - b)^2 = a^2 - 2ab + b^2$

Compare the given quadratic equation and find a, b

(b) $2x^2 - 5x + 3 = 0$

Divide the whole equation by 2

$$x^2 - \frac{5}{2}x + \frac{3}{2} = 0$$

$$x^2 - 2(x)(\quad) + (\quad)^2 - (\quad)^2 + \frac{3}{2} = 0$$

$$(x - \square)^2 = \square^2 - \frac{3}{2} ; \text{ Simplyfy.}$$



Remedial Task (4)

Calculation Errors

Find the errors and correct it.

Error	Correction
1. $117 > 65$ $117 = 65 \times 2 + 45$	
2. $\frac{616}{6} \text{ cm}^2$ $= 912.6 \text{ cm}^2$	
3. $120 + \frac{13}{14} \times 20$ $= \frac{1680 + 13}{14} \times 20$	
4. $(-2)^2 + (-8)^2$ $= 4 + 64$ $= 70$	
5. $\sqrt{(4-1)^2 + (2-7)^2}$ $= \sqrt{3^2 + (-5)^2}$ $= \sqrt{9 + 25}$ $= \sqrt{36}$ $= 6 \text{ Units}$	



Error	Correction
<p>6. $\frac{5}{20} + \frac{163}{4}$ = 168</p>	
<p>7. $(14 + x)^2 = x^2 - 16 + 4x$ $\Rightarrow 196 = x^2 + 4x - 11$ $\Rightarrow 4x = 196 + 16$ = 212 $\Rightarrow x = 53$</p>	
<p>8. $27x = 21x - 612$ $\Rightarrow 6x = -612$ $x = -12$</p>	
<p>9. $2x(x - 3) = 6$ $\Rightarrow 2x^2 - 3 = 6$ $\Rightarrow x^2 = \frac{9}{2}$ $\Rightarrow x = \frac{3}{\sqrt{2}}$</p>	
<p>10. $x^2 - 10x + 25 = 36$ $\Rightarrow (x - 5)^2 = 36$ $\Rightarrow x - 5 = 6$ $\Rightarrow x = 11$</p>	



Arithmetic Progression

Task-1: Pattern Observation


Topic	Arithmetic progression in geometric patterns
Nature of task	Warm up
Learning objective	<ul style="list-style-type: none">To develop the understanding of arithmetic progression as list of numbers in which successive term is obtained by adding a fixed number to previous term.To observe the geometric patterns and understand the concept of arithmetic progression
Execution of task	Students can be asked to bring bunch of 100 matchsticks and carry out the activity of creating row of squares according to the instructions in the sheet.
Duration	1 Period
Criteria for assessment	Students need not be evaluated for this task. The task is meant to motivate the students to study the progression. A follow up worksheet can be given to assess their readiness to understand the topic further.


Activity Sheet


Name of Student.....

Date.....

Instructions : Using matchsticks create row of squares as shown below and count the number of matchsticks required in each case.

Row containing 1 square 

Row containing 2 squares 

Row containing 3 squares 



Complete the following table:

Row containing squares	No. of matchsticks required
1	4
2	7
3	
4	
5	
6	
7	
8	
9	

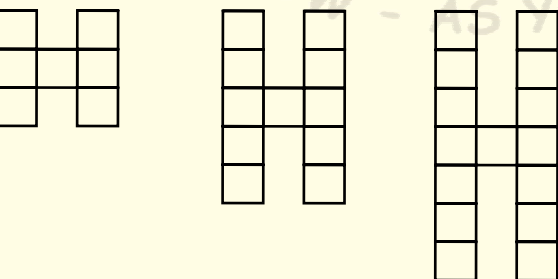
Q.1. What do you observe about the number of matchsticks required with addition of one square in each case?

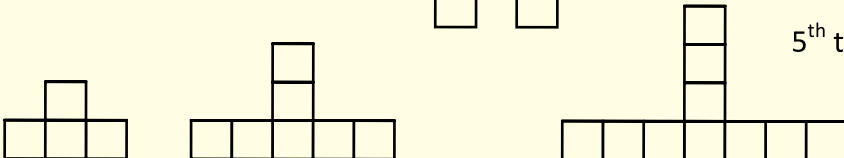
Q.2. How many matchsticks will be required for row containing 10 squares, 20 squares, 50 squares?

Follow up worksheet

1. Observe the following patterns. Count the number of squares in each term. Guess the no. of squares required for mentioned term.

a)  6th term

b)  7th term

c)  5th term



2. Observe the number sequence and complete the next three terms of the sequence:

i. 2, 7, 12, 17, $_$, $_$, $_$

ii. 5, 18, 31, 44, $_$, $_$, $_$

iii. 11, 22, 33, 44, $_$, $_$, $_$

Task-2: Oral questions

Topic	Arithmetic progression in daily life
Nature of task	Precontent
Learning objective	<ul style="list-style-type: none"> To identify the situations in daily life where the A.P. is observed. To identify the first term and common difference. To calculate the required term.
Execution of task	Teacher can take some slips containing some situations to the class. Call the students to read the statement on slips and ask them to interpret it mathematically. If required initiate the discussion for deeper understanding.
Duration	1 Period
Criteria for assessment	Students can be evaluated on their enthusiasm, interest in discussion and participation. Objective of assessment will be diagnostic.

Suggestive Situations :

- Rajan joined a company on initial salary of Rs.50000 per month with annual increment of Rs. 4500. What will be his salary in 5th year.
- Shalini purchased National saving certificate of Rs. 5000 on her daughter's first birthday and decided to purchase NSS of Rs. 500 more on every subsequent birthday. How much money she will be able to save by her 18th birthday.
- The taxi fare for the first km. is Rs. 20 and for each additional km. is Rs. 8.
- The amount of air present in a cylinder when a vaccum pump removes one-fourth of the air remaining in the cylinder at a time.
- The circumference of circle when there is constant increase of 2 cm. in radius and the first circle has radius of 8 cm.



Task-3: Class test

Topic	Arithmetic progression
Nature of task	Content
Learning objective	<ul style="list-style-type: none"> To recognize A.P. To identify the first term and common difference. To calculate the nth term and required term.
Execution of task	Class-Test
Duration	1 Period
Criteria for assessment	Students can be given marks according to correctness of response.
Follow up	All questions shall be discussed in the class. To further strengthen the concept time of 2-3 days can be given to students and MCQ can be conducted.

Class Test

M.M.- 20

Time Alloted: 25 Minutes

Q.1. Check whether the given sequence is A.P. or not?

1	7, 7, 7, 8, 9,....	
2	-1, -1.5, -2, -2.5,	
3	5, 4, 6, 4,	
4	4, 9, 16, 25,	
5	90, 80, 70, 60,	
6	8, 8, 8, 8,	
7	a, a+1, a+2, a+3,	
8	a, a -2, a-3, a -4, ...	



Q.2. Write the first term, common difference, nth term of A.P.

A.P.	a = first term	d = common difference	$a_n = a + (n-1) d$
a, 2a, 3a, 4a, ...			
-1.2, -3.2, -5.2, ...			
1, 3, 5, 7,...			
-2, 2, 6, 10,...			
8, 8, 8, 8,...			
$1/3, 5/3, 9/3, 13/3, \dots$			

MCQ Sheet

- The common difference of the A.P. whose general term $a_n = 2n + 1$ is
 A. 1 B. 2 C. -2 D. -1
- The number of terms in the A.P. 2, 5, 8,....., 59 is
 A. 12 B. 19 C. 20 D. 25
- The first positive term of the A.P. -11, -8, -5,.....,
 A. -2 B. 1 C. -4 D. 3
- The 4th term from the end of the A.P., 2, 5, 8,....., 35 is
 A. 29 B. 26 C. 23 D. 20
- The 11th and 13th terms of an A.P. are 35 and 41 respectively its common difference is
 A. 38 B. 32 C. 6 D. 3
- The next term of the A.P. $\sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$ is
 A. $5\sqrt{2}$ B. $5\sqrt{3}$ C. $3\sqrt{3}$ D. $5\sqrt{3}$
- If for an A.P. $a_5 = a_{10} = 51$, then a_{15} is
 A. 71 B. 72 C. 76 D. 81
- Which of the following is not an A.P. ?
 A. 1, 4, 7,..... B. -5, -2, 1, 4,.....
 C. 3, 7, 12, 18,..... D. 11, 14, 17, 20,.....
- The sum of first 20 odd natural numbers is
 A. 281 B. 285 C. 400 D. 421



10. The sum of first 20 natural numbers is
 A. 110 B. 170 C. 190 D. 210
11. The sum of first 10 multiples of 7 is
 A. 315 B. 371 C. 385 D. 406
12. If the sum of the A.P. 3, 7, 11,..... is 210, the number is terms is
 A. 10 B. 12 C. 15 D. 22

Task-4: Laboratory activity

Topic	Arithmetic progression
Nature of task	Content
Learning objective	<ul style="list-style-type: none"> To verify the formula for sum of first n natural numbers.
Execution of task	Teacher can give prior instructions for the required material for activity. Instructions to carry out the activity can be given. Students will be asked to record the procedure and observations systematically in their lab.file.
Duration	1 Period
Criteria for assessment	Students can be evaluated according to rubric for maths lab activity.

Instruction Sheet

Activity: To verify that sum of n natural numbers is $n(n+1)/2$

Material required: Pencil, glue, coloured paper, and scissor

Procedure: and paste it. Mark the rows containing 1 square, 2 squares, upto 10 squares in ascending order. Mark the rows containing squares in same fashion in descending order to complete the square as following sample.



Complete the following blanks.

Area of square =

Area of orange region =

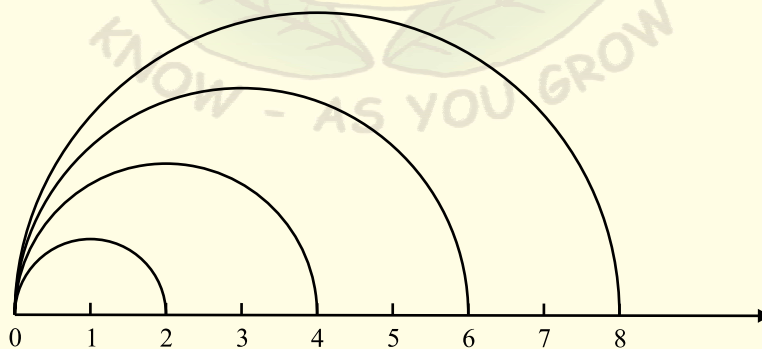
$$1 \square + 2 \square + 3 \square + \dots + 10 = \square$$

Repeat the same procedure with set of 11 and 12 squares and so on.



Conclusion:**Task-5: Project: create a design using A.P.**

Topic	Arithmetic progression
Nature of task	Post-content
Learning objective	<ul style="list-style-type: none"> To appreciate the beauty of geometrical designs obtained by using A.P. and to create more geometrical patterns.
Execution of task	Students can choose any A.P. and create a geometrical design accordingly.
Duration	3-4 Days
Criteria for assessment	Students can be evaluated on their enthusiasm, creativity, presentation of work, timely submission.

Sample Design

Students can fill in different colours to make it more beautiful.



Task-6: Assignment

Topic	Arithmetic progression
Nature of task	Post-content
Learning objective	<ul style="list-style-type: none"> To apply the concepts learnt in solving problems.
Execution of task	Teacher can give assignment to the students for home so that he/she can work at his/her pace with pleasure of working independently.
Duration	3-4 Days
Criteria of assessment	Submission in time, presentation, completed on his own, accuracy, confidence and courage to discuss problems encountered during completion of assignment.
Follow up	Assignments shall be checked thoroughly and errors shall be discussed with the students individually. Where ever necessary more practice sheets can be given.

Home Assignments

- If the n^{th} term of an A.P. is $3n + 2$, find its common difference.
- If the sum to first n terms of an A.P. is $3n^2 + 2n$, find the A.P.
- What is the first negative term of the A.P. $-17, -14, -11, \dots$?
- If 5^{th} and 10^{th} terms of an A.P. are 26 and 51 respectively, find its 15^{th} term.
- Find the sum of first 50 odd natural numbers.
- If five times the 5^{th} term of an A.P. is equal to 8 times its 8^{th} term, find the 13^{th} terms of the A.P.
- In an A.P., prove that $a_{m+n} + a_{m-n} = 2a_m$
where a_n denotes its n^{th} term.
- Find the sum of all 3-digit numbers which are divisible by 13.
- The sum of three numbers in A.P. is 3 and their product is -35 . Find the number.
- Divide 56 into four parts which are in A.P. such that we ratio of product of extremes to the product of mean is 5:6.



Triangles

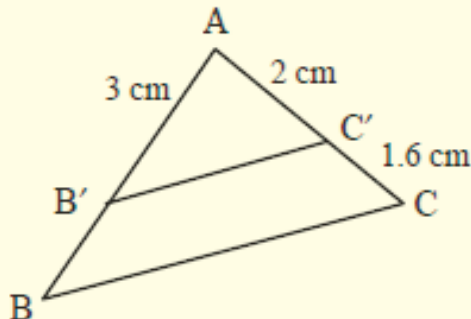
Suggested Formative Assessment Tasks

Task-1: Class Worksheet

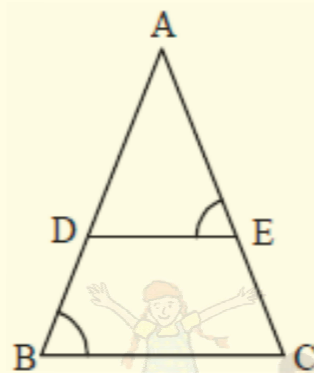
Topic	Triangles
Nature of Task	Content
Content Coverage	<ul style="list-style-type: none">• Concept of similarity of triangles• Basic Proportionality theorem• Similarity Rules (SAS,SSS,AA)• Pythagoras Theorem & its converse.
Task	Class Worksheet
Execution of task	Printed worksheet containing questions may be given. They would be then asked to write the answers to questions.
Duration	1 period
Criteria for assessment	Follow rubric for C.W./H.W/Assignment

Worksheet-1

- Fill in the blanks:
 - All equilateral triangles are _____ (Similar/congruent)
 - If $\triangle ABC \sim \triangle FED$ then $\frac{AB}{\square} = \frac{\square}{ED} = \frac{AC}{\square}$
 - Circle with equal radii are _____ (Similar/congruent)
- In given Figure $B'C' \parallel BC$.
Find AB.



3. In given figure $AD/DB = AE/EC$ and $\angle AED = \angle ABC$
 Show that $AB = AC$.



4. ΔPQR is similar to ΔABC such that Area $\Delta PQR = 4$ (Area ΔABC). Find the ratio of their perimeters.
5. Write the statement of Pythagoras Theorem.
6. An aeroplane leaves an airport and flies due north at a speed of 1000 km per hour. At the same time, another aeroplane leaves the same airport and flies due west at a speed of 1200 km per hour. How far apart will be the two planes after one & half hours?
7. In a ΔABC right angled at C, $AC = BC$. Then $AB^2 = \underline{\hspace{1cm}} \times AC^2$

Task-2: MCQ

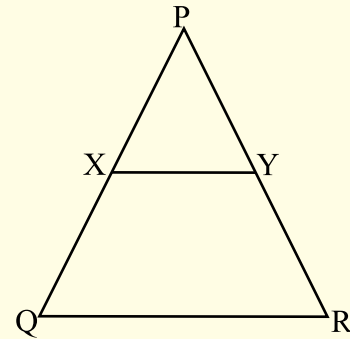
Topic	Triangles
Nature of task	Content Delivery
Content Coverage	Complete Chapter
Task	MCQ
Execution of task	Printed assignment may be given after completing the chapter. After completion of worksheet, teacher can ask children to interchange their sheets & a quick evaluation can be done by class discussion.
Duration	1 period
Criteria for assessment	1 mark for each correct answer.



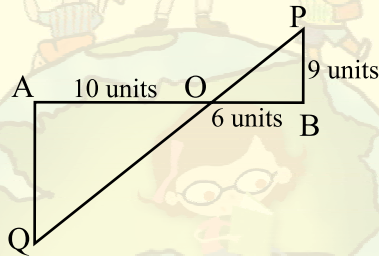
MCQ Worksheet

1. In the following fig. $XY \parallel QR$ and $\frac{PX}{XQ} = \frac{PY}{YR} = \frac{1}{2}$, then

- (i) $XY = QR$
 (ii) $XY = \frac{1}{3} QR$
 (iii) $XY^2 = QR^2$
 (iv) $XY = \frac{1}{2} QR$

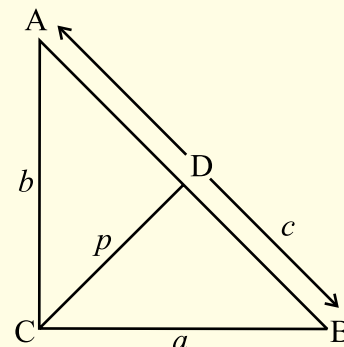


2. In the following fig $QA \perp AB$ and $PB \perp AB$, then AQ is:



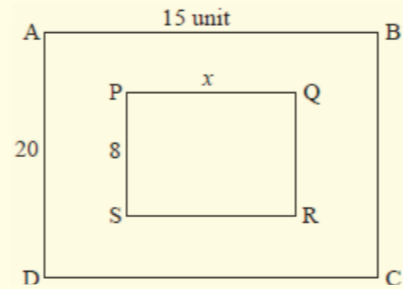
- (i) 15 units (ii) 8 units (iii) 5 units (iv) 9 units
3. The ratio of the areas of two similar triangles is equal to the:
- (i) ratio of their corresponding sides
 (ii) ratio of their corresponding altitudes
 (iii) ratio of the squares of their corresponding sides
 (iv) ratio of the squares of their perimeter
4. The areas of two similar triangles are 144 cm^2 and 81 cm^2 . If one median of the first triangle is 16 cm, length of corresponding median of the second triangle is:
- (i) 9 cm (ii) 27 cm (iii) 12 cm (iv) 16 cm
5. In a right triangle ABC, in which $\angle C = 90^\circ$ and $CD \perp AB$. If $BC = a$, $CA = b$, $AB = c$ and $CD = p$.

- (i) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$
 (ii) $\frac{1}{p^2} \neq \frac{1}{a^2} + \frac{1}{b^2}$
 (iii) $\frac{1}{p^2} < \frac{1}{a^2} + \frac{1}{b^2}$
 (iv) $\frac{1}{p^2} > \frac{1}{a^2} + \frac{1}{b^2}$



6. Given Quad. ABCD ~ Quad PQRS then x is:

- (i) 13 units
- (ii) 12 units
- (iii) 6 units
- (iv) 15 units



7. If $\Delta ABC \sim \Delta DEF$, $ar(\Delta DEF) = 100 \text{ cm}^2$ and $AB/DE = 1/2$ then $ar(\Delta ABC)$ is:

- (i) 50 cm^2
- (ii) 25 cm^2
- (iii) 4 cm^2
- (iv) None of the above.

8. If the three sides of a triangle are $a, \sqrt{3}a, \sqrt{2}a$, then the measure of the angle opposite to the longest side is:

- (i) 45°
- (ii) 30°
- (iii) 60°
- (iv) 90°

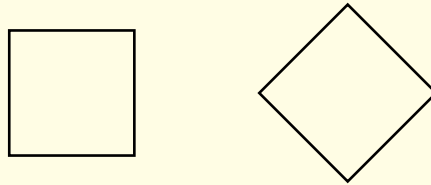
Task-3: Home Assignment

Topic	Triangles
Nature of task	Post Content
Content Coverage	Complete Chapter
Learning Objectives	<ul style="list-style-type: none"> • To understand the concept of similarity of triangles • To prove & apply Basic Proportionality theorem • To learn & apply Similarity Rules (SAS,SSS,AA) • To learn & apply Pythagoras Theorem & its converse.
Task	Home Assignment.
Execution of task	Printed assignment may be given after completing the chapter.
Duration	1-2 days.
Criteria for assessment	Follow Rubric for H.W/Assignments
Follow up	Reference material in the form of important points to remember can be given as a support material.

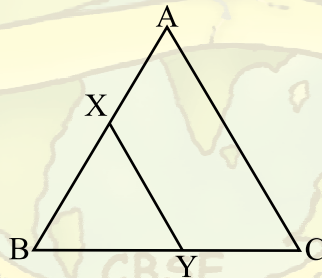


Home Assignment

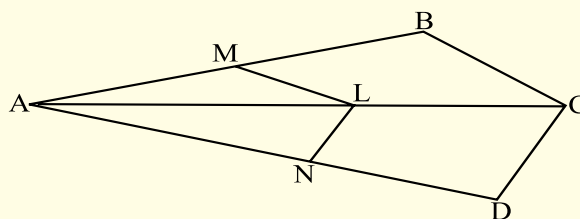
1. State whether the following pairs of polygons are similar or not:



2. In triangle ABC, $DE \parallel BC$ and $\frac{AD}{DB} = \frac{3}{5}$. If $AC = 4.8$ cm, find AE.
3. A girl of height 90 cm is walking away from the base of a lamp post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.
4. Diagonals of a trapezium ABCD with $AB \parallel CD$ intersects at O. If $AB = 2CD$, find ratio of areas of triangles AOB and COD.
5. Prove that the areas of two similar triangles are in the ratio of squares of their corresponding altitudes.
6. In the figure, the line segment XY is parallel to side AC of $\triangle ABC$ and it divides the triangle into two equal parts of equal areas. Find the ratio AX / AB .



7. In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle. Prove it.
8. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.
9. Complete the sentence: Two polygons of the same number of sides are similar if
10. (a) State and prove the Basic Proportionality theorem.
 (b) In fig, if $LM \parallel CB$ and $LN \parallel CD$, prove that $AM / AB = AN / AD$.



11. In $\triangle ABC$, $AD \perp BC$. Prove that $AB^2 - BD^2 = BC^2 - CD^2$.
12. AD is a median of $\triangle ABC$. The bisector of $\angle ADB$ and $\angle ADC$ meet AB and AC in E & F respectively. Prove that $EF \parallel BC$.

Task-4: Hands on activity

Topic	Triangles
Nature of task	Content Delivery
Learning Objectives	<ul style="list-style-type: none"> • To verify Pythagoras theorem
Task	Math activity
Execution of task	An instruction sheet containing information about material required & steps involved to do the activity can be given to students for reference. They will be then asked to perform the activity & record the outcome in the recording sheet.
Duration	1 period
Criteria for assessment	This activity will be a part of Math activity, so it will be assessed according to the following parameters : Observation on thinking skills Class Ethics Performance of activity File Record (marks may be allotted by the teacher accordingly)

NOTE : Refer CBSE lab manual for the activity on BPT

Instruction Sheet

Objective : To verify the Pythagoras Theorem by the method of paper folding, cutting and pasting. Material Required: card board, coloured pencils, pair of scissors, fevicol, geometry box.

Material Required : Card board, coloured pencils, pair of scissors, fevicol, geometry box.

Previous Knowledge :

1. Area of a square.
2. Construction of parallel lines and perpendicular bisectors.

Procedure :

1. Take a card board of size say 20 cm × 20 cm.
2. Cut any right angled triangle and paste it on the cardboard Suppose its sides are a, b and c.
3. Cut a square of side a cm and place it along the side of length a cm of the right angled triangle.



4. Similarly cut squares of sides b cm and c cm and place them along the respective sides of the right angled triangle.
5. Label the diagram as shown in Fig 1.
6. Join BH and AI . These are two diagonals of the square $ABIH$. The two diagonals intersect each other at the point O .
7. Through O , draw $RS \parallel BC$.
8. Draw PQ , the perpendicular bisector of RS , passing through O .
9. Now the square $ABIH$ is divided in four quadrilaterals. Colour them as shown in Fig 1.
10. From the square $ABIH$ cut the four quadrilaterals. Colour them and name them as shown in Fig. 2.

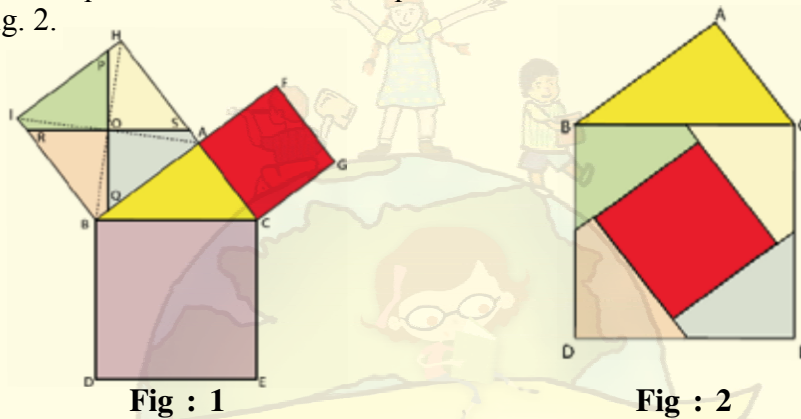


Fig : 1

Fig : 2

Observations :

The square $ACGF$ and the four quadrilaterals cut from the square $ABIH$ completely fill the square $BCED$. Thus the theorem is verified.

Conclusion :

Pythagoras theorem is verified by paper cutting & pasting.



Task-5: Class Quiz / Oral Assessment

Topic	Triangles
Nature of task	Post Content
Learning Objectives	To know, understand and apply : <ul style="list-style-type: none"> • Basic Proportionality Theorem • Ratio of areas of 2 Similar Triangles • Phythagoras Theorem • Converse of Phythagoras Theorem
Task	Class Quiz / Oral Assessment
Execution of task	This task may be performed by sparing 2 periods after the completion of the Chapter. The class may be divided in 4 teams. (Ramanujan, Aryabhat, Shakuntala Devi, Renu Descarter). The teacher can keep writing the scores on board after each round.
Duration	2 periods
Criteria for assessment	Teacher may prepare a rating scale according to marks assigned to this task.

Suggested Question for Quiz

Rapid Fire Round :

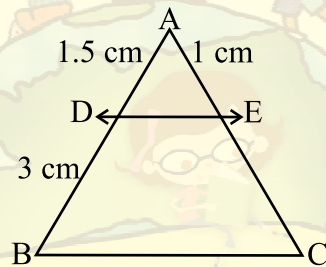
1. If a line is drawn parallel to one side of a traingle to intersect the other two sides in distinct points, the other two sides are divided in the ratio.
2. If a line divides two sides of a triangle in the same ratio, the line is to the third side.
3. If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are
4. If the corresponding sides of two triangles are, their corresponding angles are equal and the two triangles are similar.
5. If one angle of triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar by similarity.



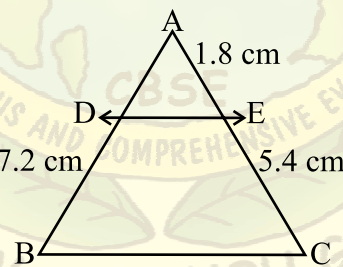
6. If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, the triangles on each side of the perpendicular are to the whole triangle and to each other.
7. The ratio of the areas of two similar triangles is equal to the ratio of the on their corresponding sides.
8. In triangle the square on the hypotenuse is equal to the sum of the squares on the other two sides.
9. In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angle opposite to the first side is a angle.

Buzzer Round :

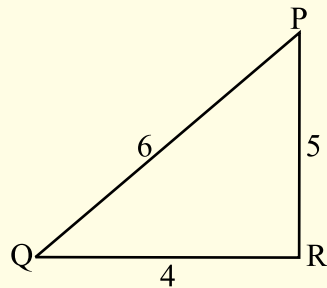
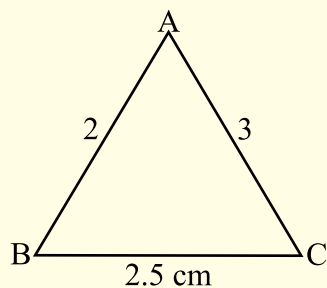
1. If $DE \parallel BC$, find EC.



2. If $DE \parallel BC$, find AD.



3. Is $\triangle ABC \sim \triangle PQR$? If no, why. If yes, name similarity criterion used.



4. $\triangle ABC \sim \triangle DEF$, such that $\text{ar}(\triangle ABC) = 64 \text{ cm}^2$ and $\text{ar}(\triangle DEF) = 121 \text{ cm}^2$. If $EF = 15.4 \text{ cm}$, find BC .
5. ABC and BDE are two equilateral triangles such that D is the mid point of BC . What is the ratio of the areas of triangles ABC and BDE .
6. Sides of 2 similar triangles are in the ratio $4:9$. What is the ratio of areas of these triangles.
7. Sides of a triangle are 7 cm , 24 cm , 25 cm . Will it form a right triangle ? Why or why not ?
8. Find $\angle B$ in $\triangle ABC = 6\sqrt{3} \text{ cm}$, $AC = 12 \text{ cm}$ and $BC = 6 \text{ cm}$.

Framing Question Round :

In this round, each team needs to frame 5 questions from the Chapter. This should be a time bound round.

