

CHAPTER-6

Lines and Angles

Task-1

Topic	Lines and angles
Nature of task	Warm up
Content Coverage	Basic geometrical terms lines, angles, line segment, point, plane, collinear and non collinear points, types of angles viz. acute, obtuse, right, reflex, straight, pairs of angles viz. complementary, supplementary, adjacent, vertically opposite, linear pair.
Learning Objectives	Recall and review basic geometrical terms lines, angles, line segment, point, plane, collinear and non collinear points, types of angles viz. acute, obtuse, right, reflex, straight, pairs of angles viz. complementary, supplementary, adjacent, vertically opposite, linear pair.
Task	Let me know ?
Execution of task	Teacher may ask questions based on previous knowledge of students.
Duration	1 period
Criteria for assessment	No assessment in terms of marks.
Follow up	Teacher may use the given flash cards for review and recall.

Suggested questions for Let me know task :

1. How many points are required to draw a line ?
2. What is an axiom ?
3. What is the difference between a line and a line segment ?
4. What are the various types of angles?
5. Give one example of a pair of complementary angles.
6. Give one example of a pair of supplementary angles.
7. What is a linear pair ?



8. If two angles form a linear pair and one of the angles is 50° , what is the measure of other angle?
9. What is the measure of a straight angle ?
10. The complementary angle of 35° is _____.
11. The supplementary angle of 132° is _____.
12. If two adjacent angles are supplementary, they form a _____.
13. Two lines perpendicular to the same line are _____ to each other.

Match the following:

Measure of an Angle

210°

135°

50°

360°

180°

330°

105°

90°

Type of the angle

obtuse angle

reflex angle

acute angle

straight angle

reflex angle

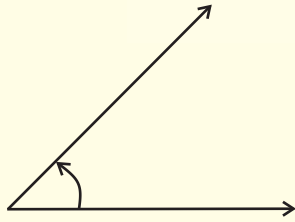
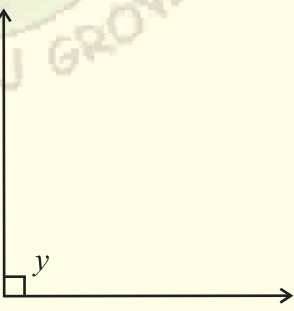
complete angle

right angle

obtuse angle

Follow up Flash cards

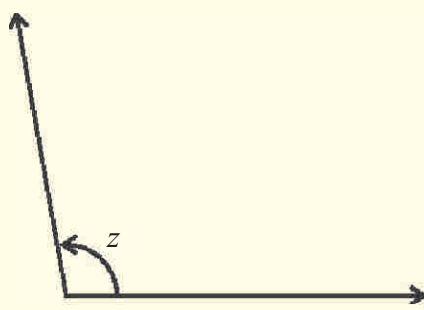
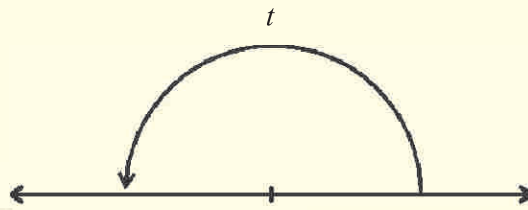
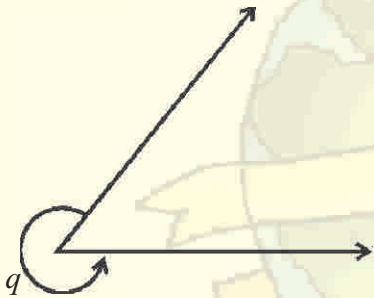
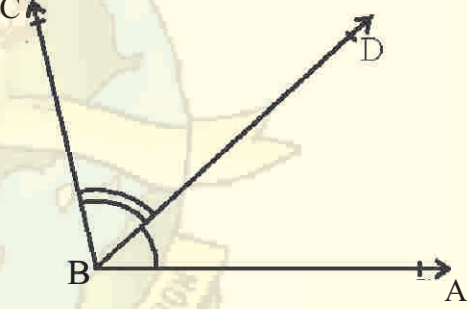
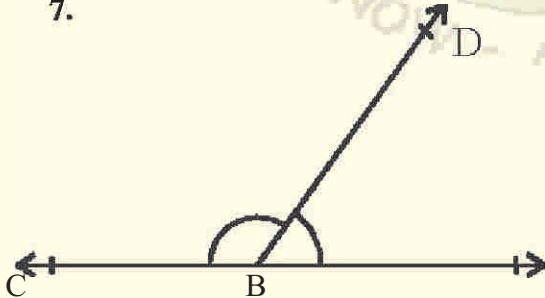
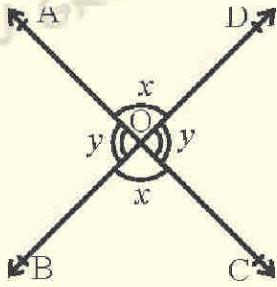
Figures Speak Flash cards

<p>1.</p>  <p>Acute Angle $0^\circ < x < 90^\circ$</p>	<p>2.</p>  <p>Right Angle $y = 90^\circ$</p>
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Follow up Flash cards

Figures Speak Flash cards

<p>3.</p>  <p>Obtuse Angle $90^\circ < z < 180^\circ$</p>	<p>4.</p>  <p>Straight Angle $t = 180^\circ$</p>
<p>5.</p>  <p>Reflex Angle $180^\circ < q < 360^\circ$</p>	<p>6.</p>  <p>$\angle ABD$ and $\angle CBD$ and adjacent angles</p>
<p>7.</p>  <p>$\angle ABD$ and $\angle CBD$ is a linear pair</p>	<p>8.</p>  <p>"AOD and BOC" and "AOB and COD" are pairs of vertically opposite angles</p>



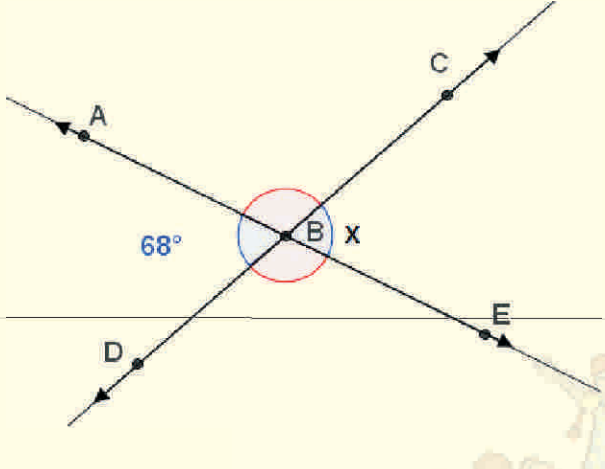
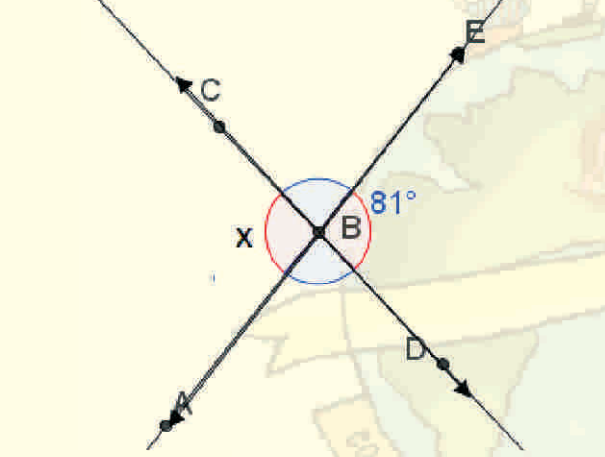
Task-2

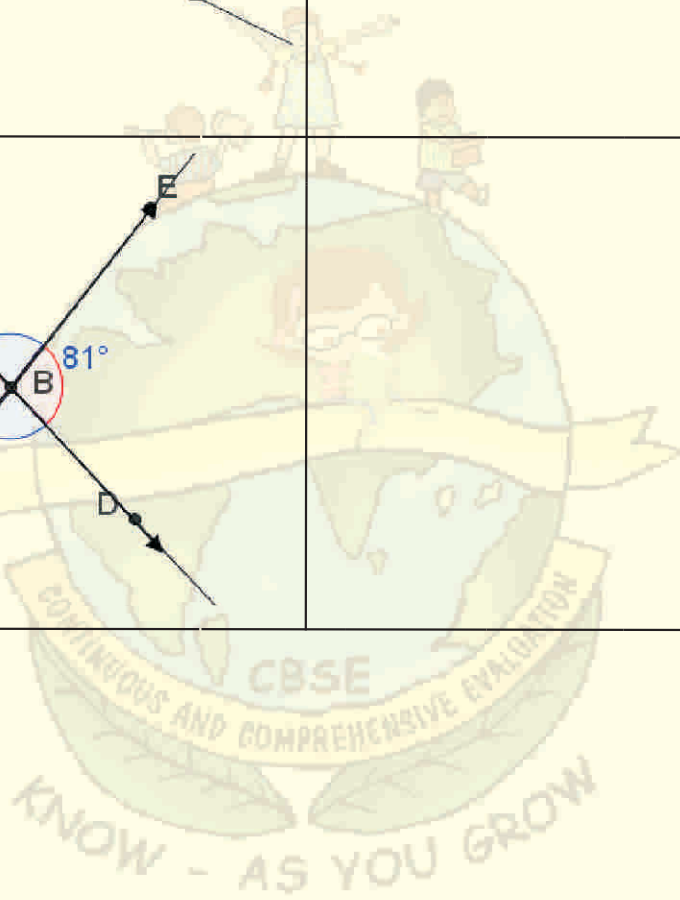
Topic	Lines and angles
Nature of task	Content
Content Coverage	Adjacent angles Vertically opposite angles
Learning Objectives	<ol style="list-style-type: none"> 1. ((Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180° and the converse. 2. (Prove) If two lines intersect, the vertically opposite angles are equal.
Task	Exploratory Worksheet
Execution of task	Prepare copies of given exploratory worksheet. Let students learn the results themselves. Followed by this give a worksheet to test the knowledge of students.
Duration	1 period
Criteria for assessment	This task may be assigned weightage. Worksheet can be assessed according to C.W./H.W./Assignment rubric.
Follow up	<p>Teacher may provide following web links to students for exploring the concept.</p> <p>(For exploring vertically opposite angles)</p> <p>http://www.mathwarehouse.com/geometry/angle/interactive-vertical-angles.php</p> <p>http://users.mct.open.ac.uk/hjh27/VOA.html</p>



Figure	$m\angle AED$	$m\angle BEC$	$m\angle AEC$	$\angle BED$	Observations

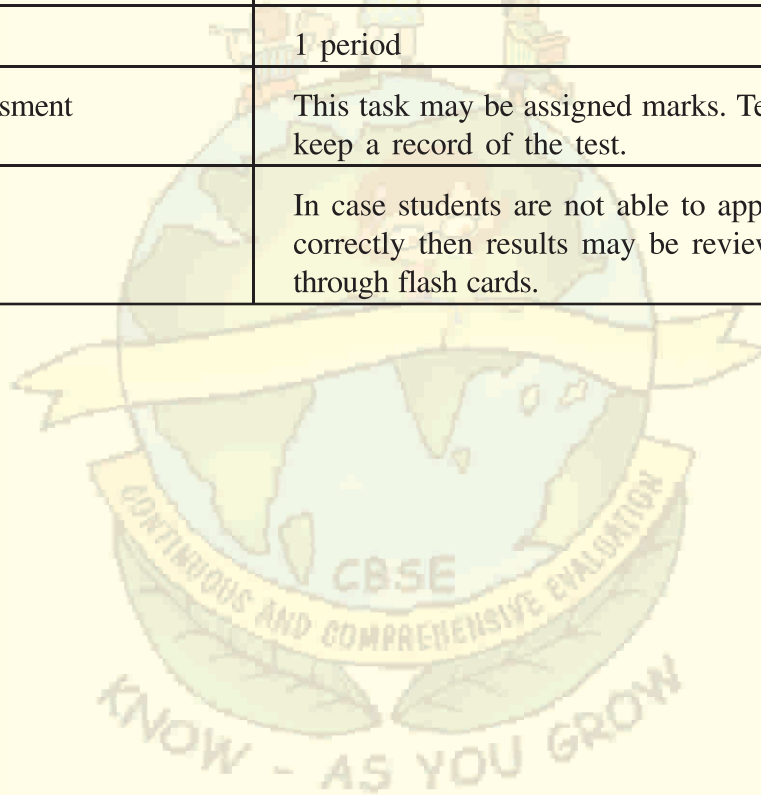


Find x	Justify your answer
	
	



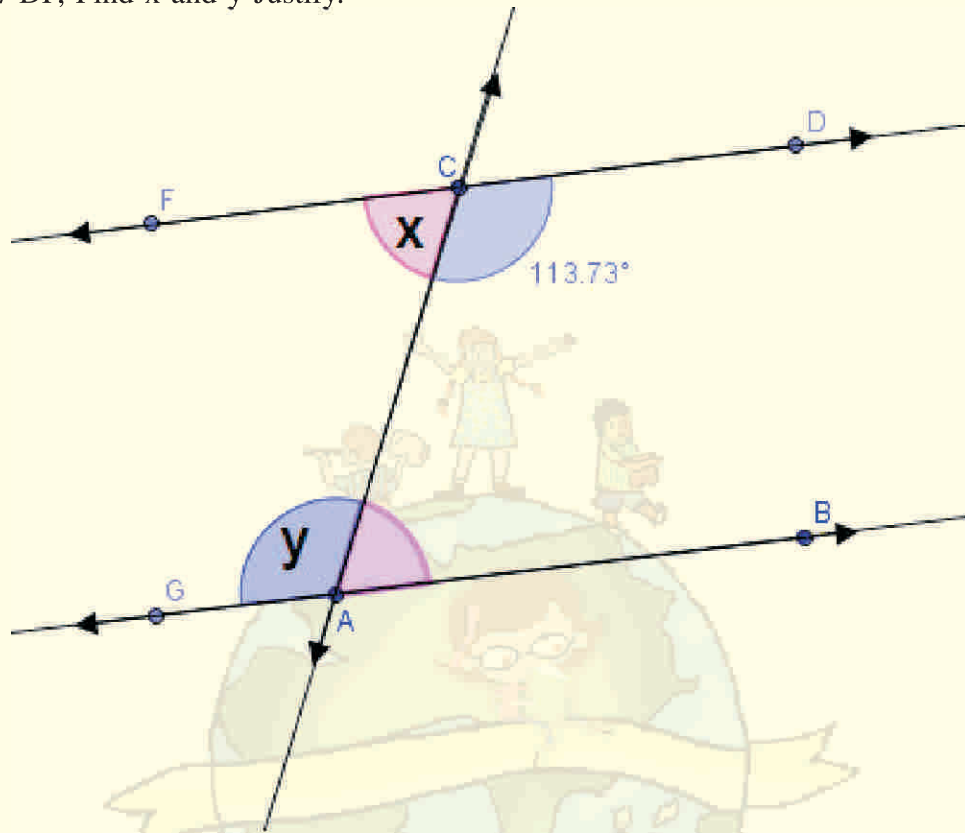
Task-3

Topic	Lines and angles
Nature of task	Post Content
Content Coverage	Results on corresponding angles, alternate angles, cointerior angles when a transversal intersects two parallel lines.
Learning Objectives	To test the knowledge of students whether they are able to apply the knowledge of parallel lines and transversal.
Task	Worksheet- Apply your knowledge
Execution of task	Teacher may provide this worksheet in the classroom. Students would be then asked to solve the questions.
Duration	1 period
Criteria for assessment	This task may be assigned marks. Teacher would then keep a record of the test.
Follow up	In case students are not able to apply the knowledge correctly then results may be reviewed and re learnt through flash cards.

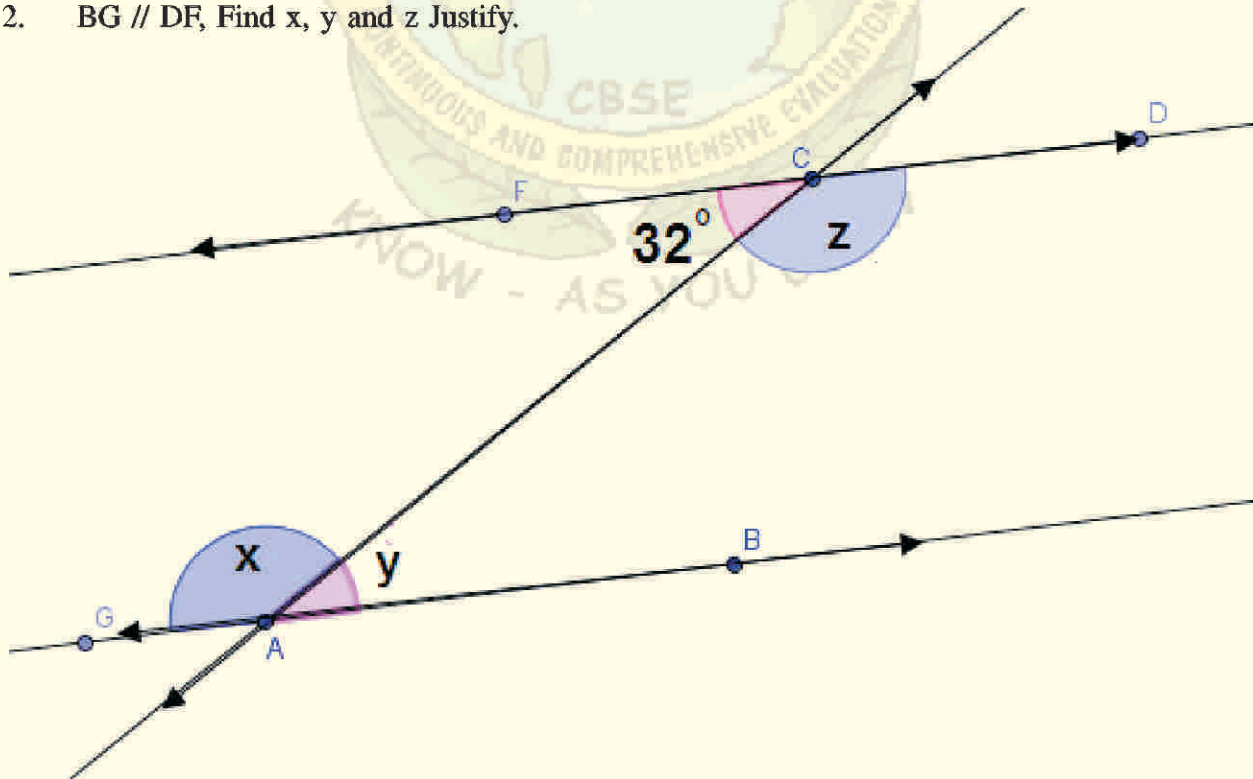


Class Test

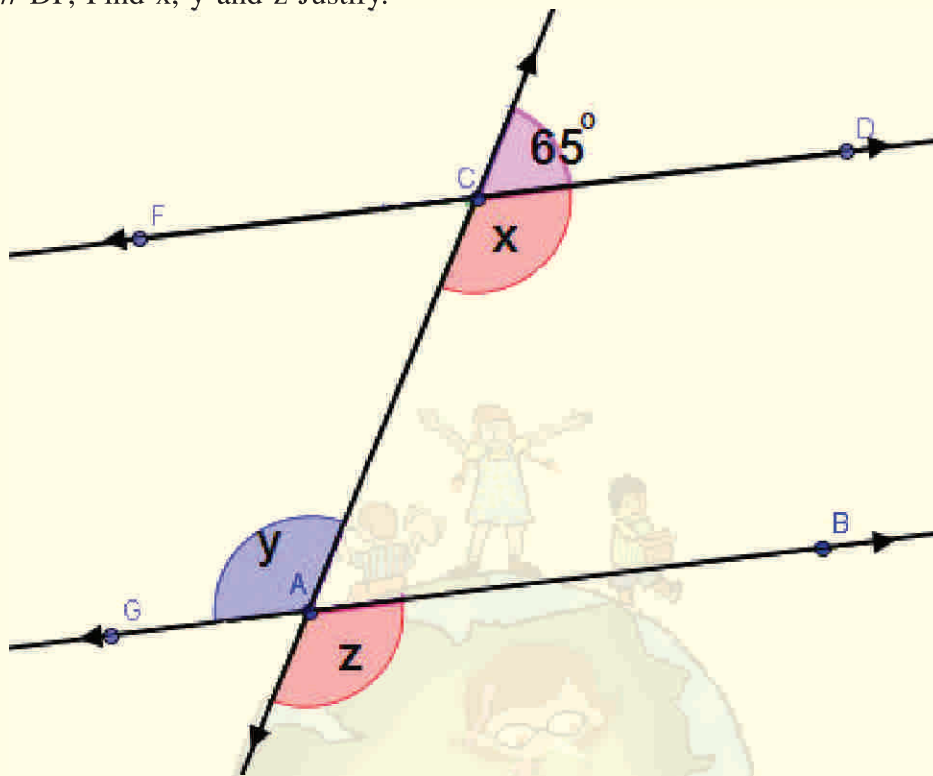
1. $BG \parallel DF$, Find x and y Justify.



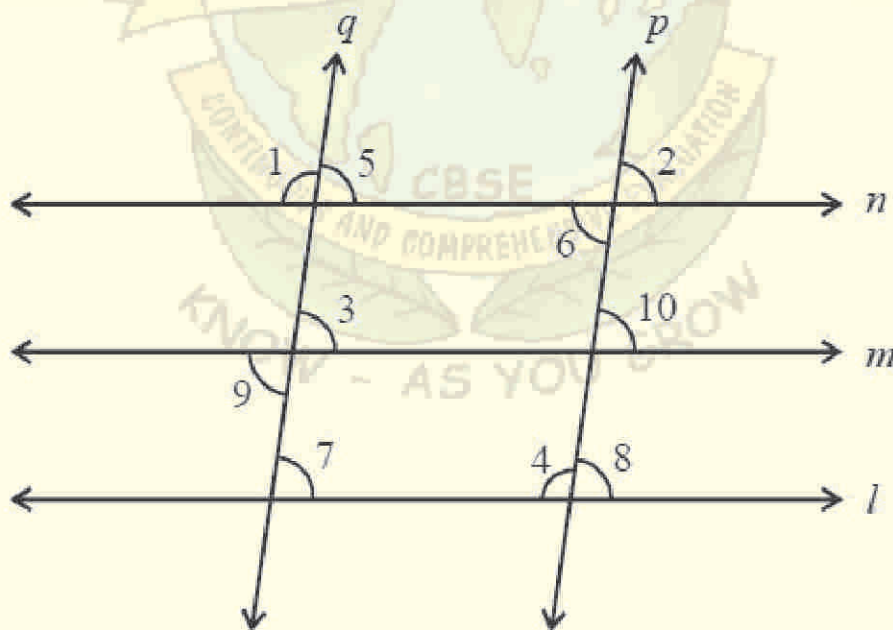
2. $BG \parallel DF$, Find x , y and z Justify.



3. $BG \parallel DF$, Find x , y and z Justify.



4. (a) In the given figure $l \parallel m \parallel n$ and $p \parallel q$, name the pairs of angles.



- | | | | |
|--------------------------|--------------------------|---------------------------|--------------------------|
| (A) $\angle 1, \angle 5$ | (B) $\angle 2, \angle 8$ | (C) $\angle 2, \angle 6$ | (D) $\angle 4, \angle 7$ |
| (E) $\angle 1, \angle 3$ | (F) $\angle 9, \angle 7$ | (G) $\angle 6, \angle 10$ | (H) $\angle 5, \angle 7$ |

(b) If $\angle 1 = 105^\circ$, find the measure of rest of angles, Justify your answers.



Task-4:

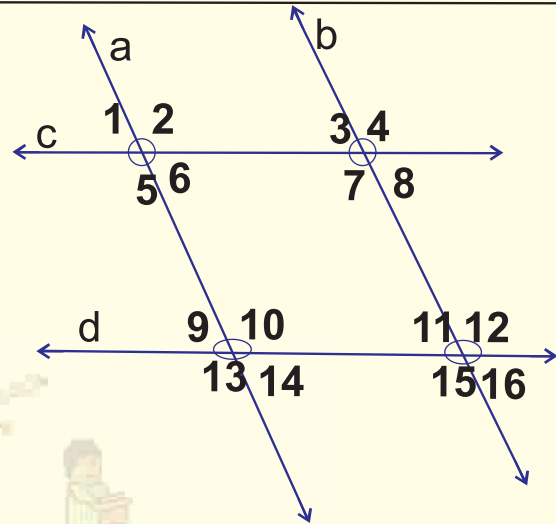
Topic	Lines and angles
Nature of task	Post Content
Content Coverage	Parallel lines
Learning Objectives	<ol style="list-style-type: none"> (Motivate) Results on corresponding angles, alternate angles, co-interior angles when a transversal intersects two parallel lines. (Motivate) Lines, which are parallel to a given line, are parallel to each other.
Task	Home Assignment
Execution of task	After the concept is taught in the classroom, teacher may write the questions on the board or give a Home assignment to students.
Duration	2 days
Criteria for assessment	This task may be assigned weightage. Worksheet can be assessed according to C.W./H.W./Assignment rubric.
Follow up	<p>(Concept can be explained using http://www.mathsisfun.com/geometry/parallel-lines.html)</p> <p>Students can then spend 15 minutes on playing with parallel lines using http://www.shodor.org/interactivate/activities/Angles/</p> <p>Parallel lines Example problem 1 Video http://www.youtube.com/watch?v=XQUbFCAv_U4&feature=related</p> <p>Parallel lines Example problem 2 Video http://www.youtube.com/watch?v=eQzKo-eNahA&feature=channel)</p>



Worksheet

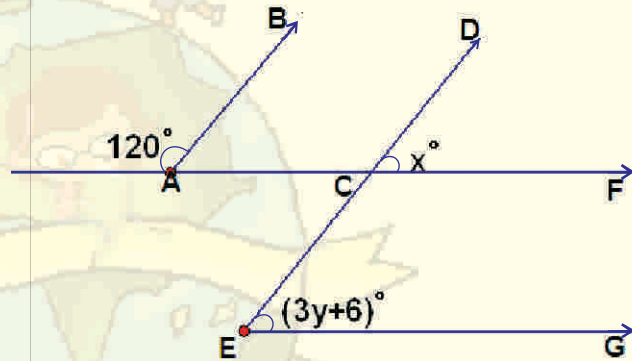
Q.1. In the given figure $a \parallel b$ and $c \parallel d$.

- i. Name all angles equal to $\angle 5$. Justify your answer.
- ii. Name all angles supplementary to $\angle 8$. Justify your answer.
- iii. If $\angle 4 = 110^\circ$, then find all other angles. What all properties of parallel lines you have used here?



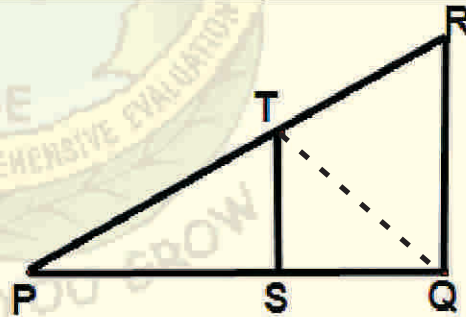
Q.2. Solve for x, y . It is given that $AB \parallel CD$ and $CF \parallel EG$.

Write the linear relationship between x and y . Justify your answer.

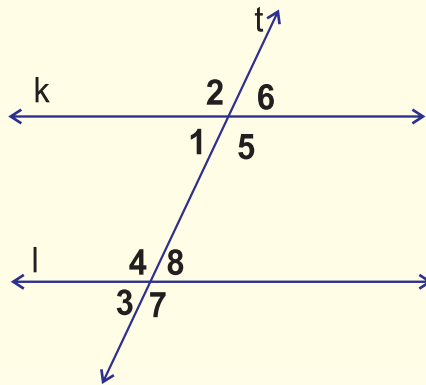


Q.3. In the given figure $PQ \perp QR$, $ST \parallel QR$, QT bisects $\angle PQR$.

- i. Find the measures of $\angle QST$, $\angle SQT$ and $\angle STQ$
- ii. If $\angle PRQ = 70^\circ$ then find $\angle QTR$



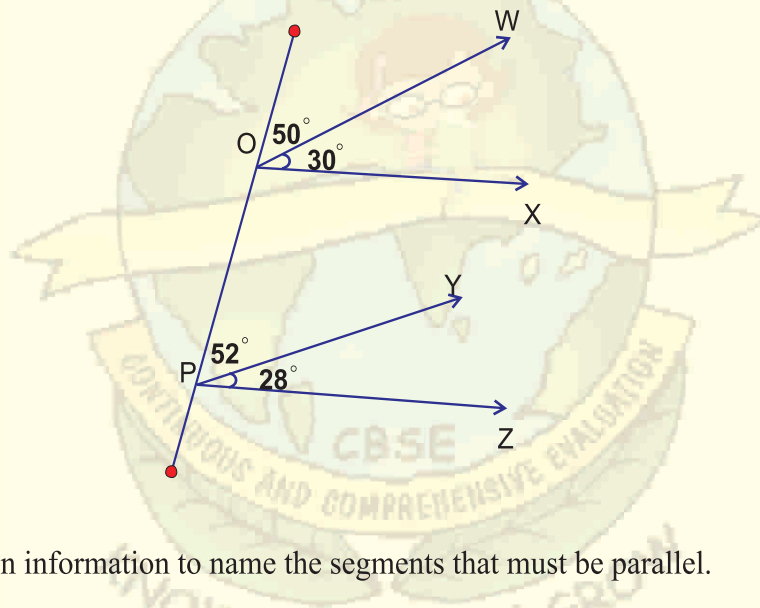
Q.4. Write a proof.



Given: $k \parallel l$

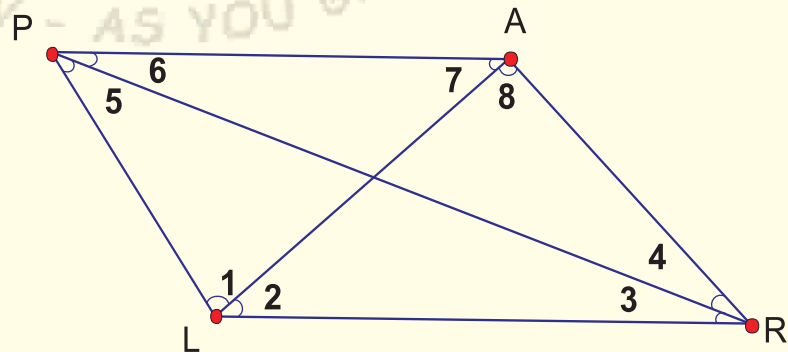
Prove that $\angle 6 + \angle 7 = 180^\circ$.

Q.5. State which segments (if any) are parallel? State the postulate or theorem that justifies your answer.



Q.6. Use the given information to name the segments that must be parallel.

- i. $\angle 1 = \angle 8$
- ii. $\angle 2 = \angle 7$
- iii. $\angle 5 = \angle 3$
- iv. $\angle 5 = \angle 4$
- v. $\angle 5 + \angle 6 = \angle 3 + \angle 4$



(In case you do not find line segments parallel, justify why?)



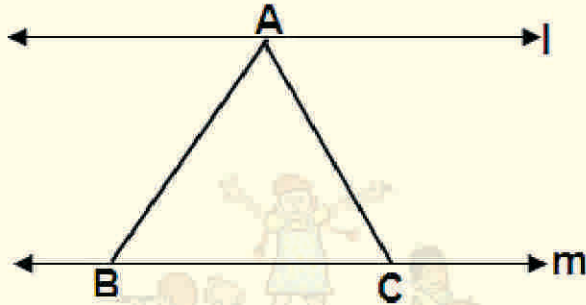
Task-5:

Topic	Lines and angles
Nature of task	Content
Content Coverage	Angle sum property of a triangle Exterior angle property of a triangle
Learning Objectives	<ol style="list-style-type: none"> (Prove) The sum of the interior angles of a triangle is 180° (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.
Task	Worksheet
Execution of task	After the concept is taught in the classroom, teacher may write the questions on the board or give a worksheet to students.
Duration	1 period
Criteria for assessment	This task may be assigned weightage. Worksheet can be assessed according to C.W./H.W./Assignment rubric.
Follow up	<p>As a follow up task, extra questions for practice may be given.</p> <p>Teacher may share web links for further learning also.</p> <p>Angle sum property of a triangle activity (http://www.youtube.com/watch?v=vw-rOqDBAvs)</p> <p>Students can be given time to have a hands on using interactive GeoGebra Applet for verifying the theorem "the sum of three interior angles of a triangle is 180°"</p> <p>Hands on interactive Geometr http://www.geogebra.org/en/wiki/index.php/Angles</p> <p>Watch this video-application of angle sum property of triangle http://www.youtube.com/watch#!v=eo8bpowBK4&feature=related</p> <p>Watch this video-exterior angle property of a triangle http://www.youtube.com/watch?v=s4KPzc6rSyE&feature=related</p> <p>http://www.youtube.com/watch#!v=YS2K2SpvVIA&feature=channel</p>

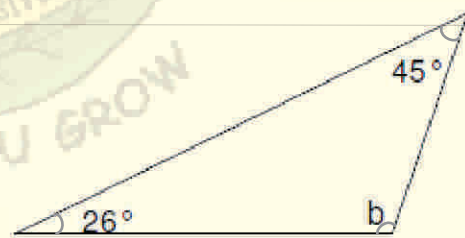
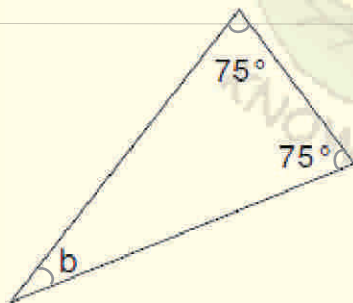
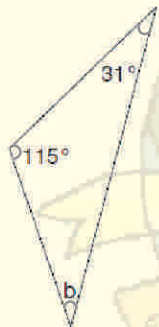


Worksheet

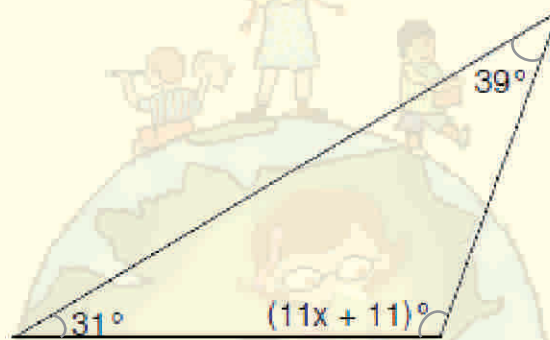
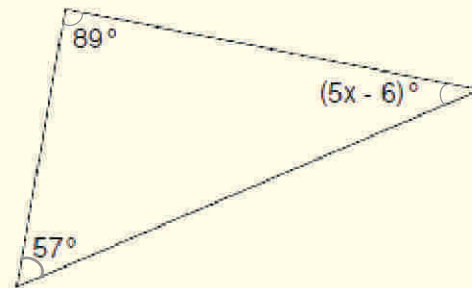
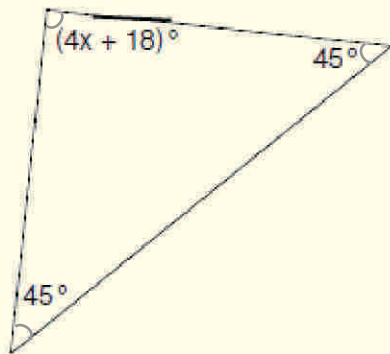
- Q.1.** From the figure given below, extract the proof “the sum of three interior angles of a triangle is 180° ”. It is given that $l \parallel m$.
(Hint: Use properties of parallel lines, angles on a straight line)



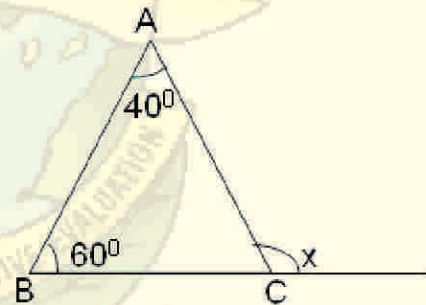
- Q.2.** Find b in the following diagrams. Write the property used.



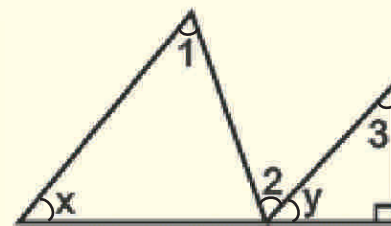
Q.3. Find x in the following diagrams. Write the property used.



Q.4. Find x in the given figure. Justify your answer.



Q.5. If $m \angle 1 = 53^\circ$, $m \angle 2 = 65^\circ$, and $m \angle 3 = 43^\circ$, find the measures of $\angle x$ and $\angle y$. Justify your answers.

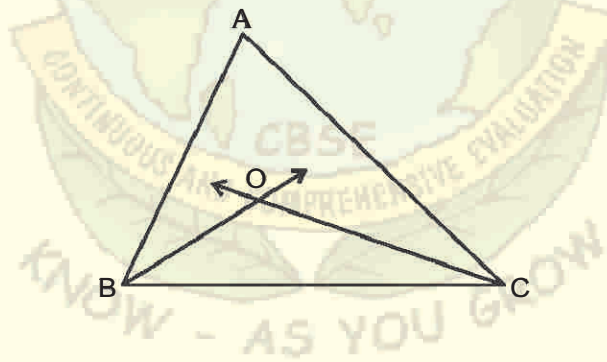


Task-6:

Topic	Lines and angles
Nature of task	Post Content
Content Coverage	Complete Chapter
Learning Objectives	As stated in all other tasks
Task	M.C.Q. Worksheet
Execution of task	Prepare copies of given worksheet. This task may be assigned to students as home work.
Duration	1 day
Criteria for assessment	This task may be assigned weightage. Worksheet can be assessed according to C.W./H.W./Assignment rubric.
Follow up	Suggest learning material to students if needed.

MCQ Worksheet

1. In the given figure, the bisectors of $\angle ABC$ and $\angle BCA$, intersect each other at point O. If $\angle BOC = 100^\circ$, the $\angle A$ is

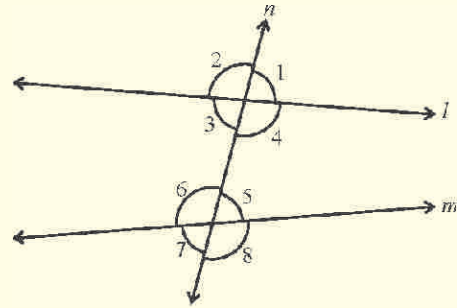


- A. 30° B. 20° C. 40° D. 50°
2. What is common between the three angles of a triangle and a linear pair
- A. angles are equal
- B. In both cases sum of angles is 180°
- C. In triangle there are three angles and in linear pair there are two angles.
- D. None of these



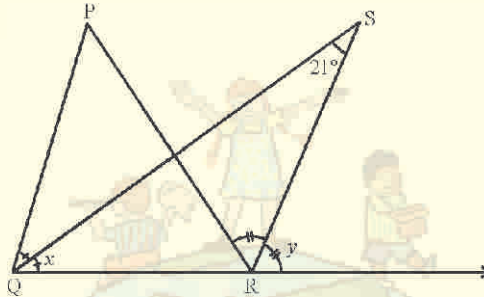
3. In the given figure, $\angle 2$ and $\angle 8$ are known as

- A. exterior angles
- B. exterior angles on the same side of transversal
- C. alternate angles
- D. alternate exterior angles



4. In the given figure, measure of $\angle QPR$ is

- A. 10.5°
- B. 42°
- C. 111°
- D. 50°

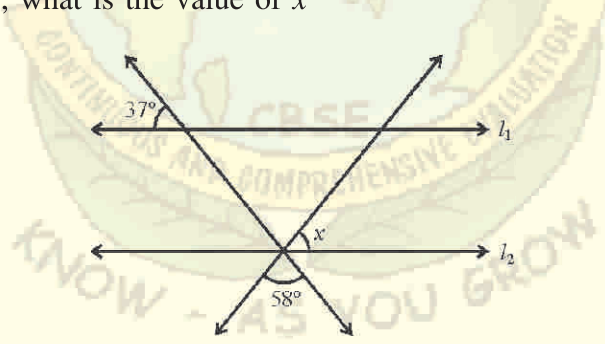


5. An angle is 20° more than three times the given angle. If the two angles are supplementary the angles are

- A. $20^\circ, 160^\circ$
- B. $40^\circ, 140^\circ$
- C. $60^\circ, 120^\circ$
- D. $70^\circ, 110^\circ$

6. In figure, if $l_1 \parallel l_2$, what is the value of x

- A. 90°
- B. 85°
- C. 75°
- D. 70°



7. If a wheel has six spokes equally spaced, then the measure of the angle between two adjacent spokes is

- A. 30°
- B. 90°
- C. 60°
- D. 180°

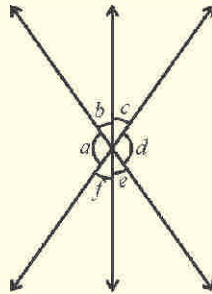


8. In figure, which of the following statements must be true?

(i) $a + b = d + c$

(ii) $a + c + e = 180^\circ$

(iii) $b + f = c + e$



A. (i) only

B. (ii) only

C. (iii) only

D. (ii)&(iii) both

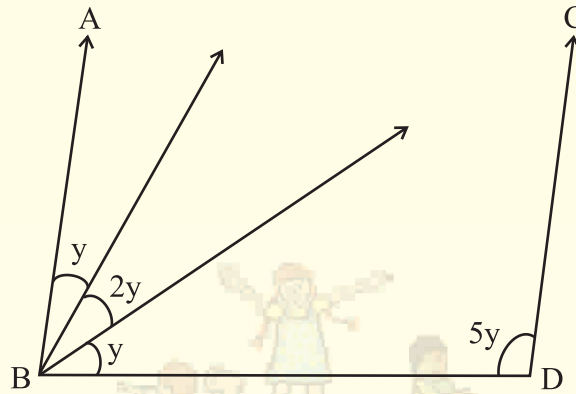
Task-7:

Topic	Lines and angles
Nature of task	Post Content
Content Coverage	Complete Chapter
Learning Objectives	As stated in all other tasks
Task	Home assignment
Execution of task	Prepare copies of given worksheet. This task may be assigned to students as home work.
Duration	1 day
Criteria for assessment	This task may be assigned weightage. Worksheet can be assessed according to C.W./H.W./Assignment rubric.
Follow up	Suggest learning material to students if needed.

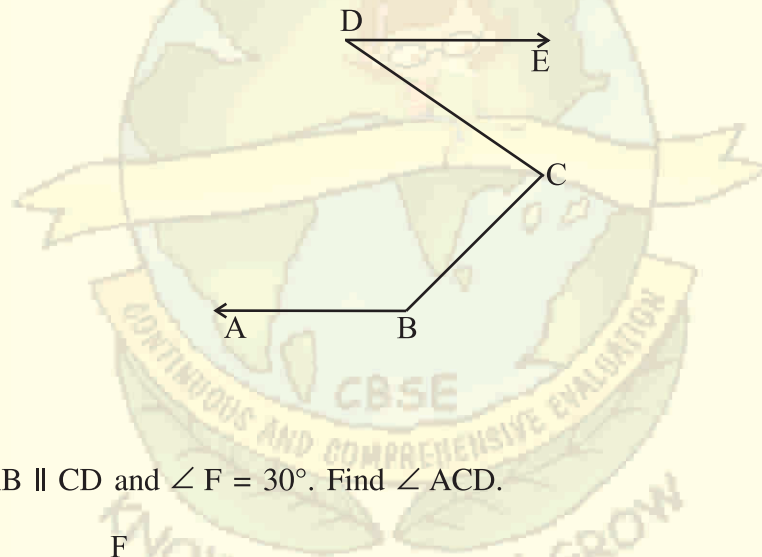


Home Assignment

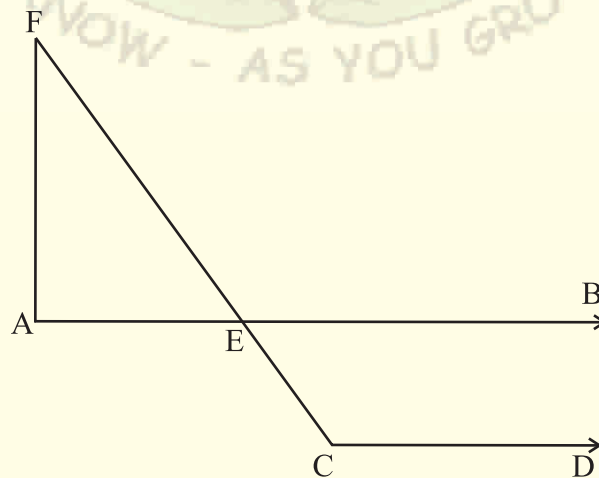
1. In the figure, If $AB \parallel CD$ then what is the value of y .



2. In the given figure, $BA \parallel DE$. Prove that $\angle ABC + \angle BCD = 180^\circ + \angle CDE$



3. In figure, $AB \parallel CD$ and $\angle F = 30^\circ$. Find $\angle ACD$.



4. In figure, If $l_1 \parallel l_2$ and $l_3 \parallel l_4$. What is y in terms of x ?

