

**SUVA SANGAM COLLEGE**

**ACTIVITIES WORKSHEET**

**SUBJECT: TECH DRAW**

**YEAR: 11**

**SUVA SANGAM COLLEGE**  
**Year 11: TECHNICAL DRAWING**

**WEEK 1**

**DATE: 05/07 – 09/07/2021**

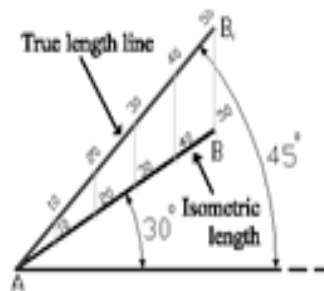
STRAND	GEOMETRY
SUB STRAND	SCALE
CONTENT LEARNING OUTCOME	Different types of scales. Constructing scales. Apply in Engineering drawing.
REFERENCE FROM TEXT BOOK	Page: 15 - 18

## SCALE

### ISOMETRIC SCALE

To construct an isometric scale

1. Draw an angle of  $45^\circ$ .
2. Mark off full measurements, as required, along the  $45^\circ$  line (true length line).
3. Draw a  $30^\circ$  line from the same vertex as  $45^\circ$  angle.
4. Drop  $90^\circ$  from the marked divisions on the  $45^\circ$  line to  $30^\circ$  line.
5. The measurements on the  $30^\circ$  lines are the isometric length.



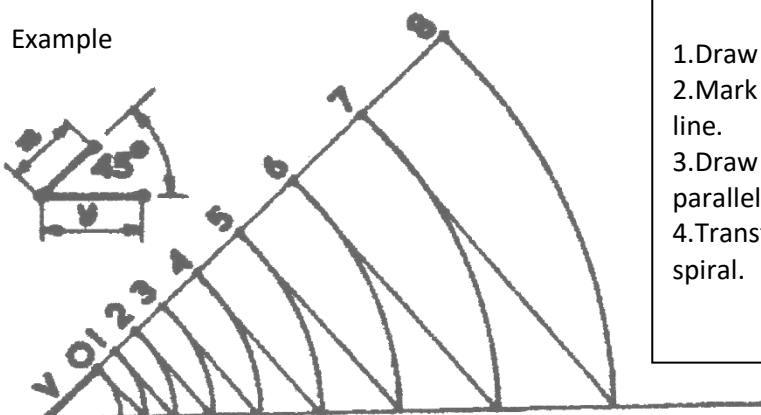
The isometric scale reduces the measurements to 81% of the full size.

### LOGARITHMIC SCALE

Logarithmic scale is used to draw a spiral which is a locus of a point moving around and approaching a fixed point by amounts in constant ratio measured along a consecutive radii.

Construction of logarithmic scale

Example



#### STEPS

1. Draw a horizontal line followed by a line at an angle  $45^\circ$ .
2. Mark 14mm on the horizontal line and 10mm on the  $45^\circ$  line.
3. Draw arcs from centre C with radius as Z. Draw line parallel to OZ from 1. Continue till point 8 ( $360^\circ/45^\circ = 8$ )
4. Transfer distance C1, C2, C3, etc. up till C8 on logarithmic spiral.

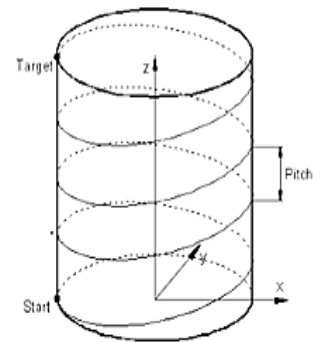
STRAND	GEOMETRY
SUB STRAND	HELIX
CONTENT LEARNING OUTCOME	Define helix and its parts Construct simple Helix Find the Helical curve
REFERENCE FROM TEXT BOOK	Page: 18

**HELIX**

A helix is a type of smooth curve in three-dimensional space. It has the property that the tangent line at any point makes a constant angle with a fixed line called the axis. Helices can be either right-handed or left-handed.

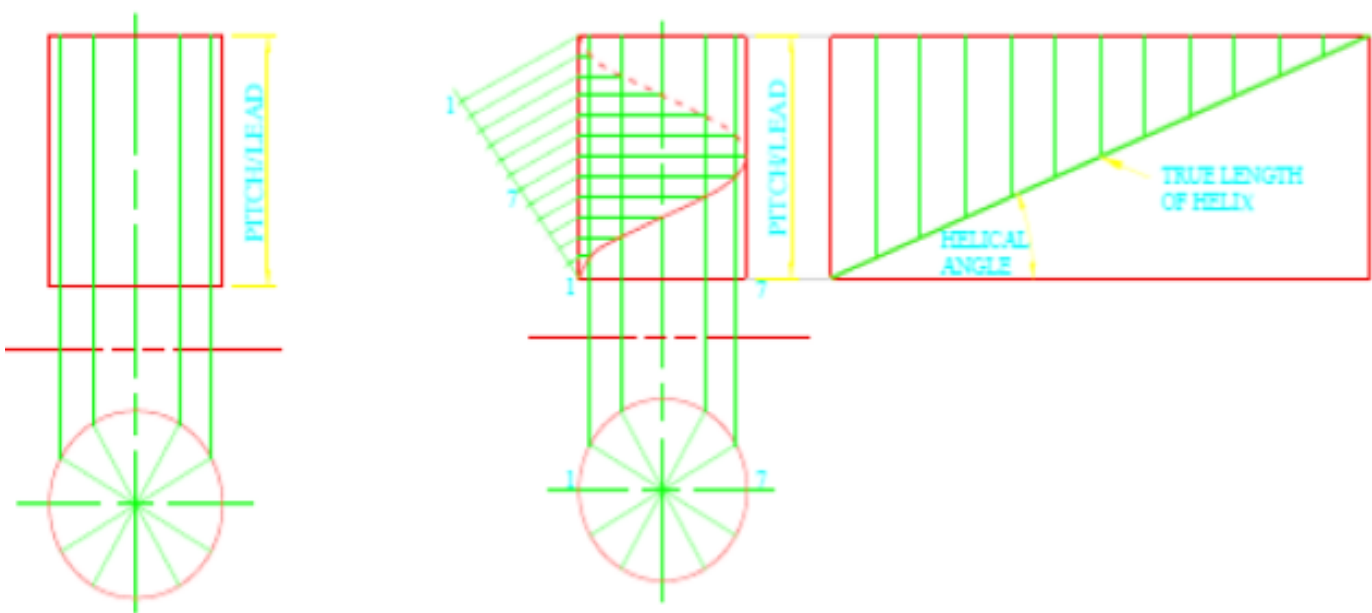
The pitch/lead of a helix is one complete helix turn, measured parallel to the axis of the helix. The development of the cylinder for one pitch/lead will provide the true length of the helical curve.

Helix is mainly used for screw threads, staircases, catwalks around fuel tanks, etc.



Construction of a simple harmonic helical curve – Example

- Step1: Draw and divide the semi-circle and the pitch/lead into 12 equal parts.
- Step2: Project the 12 generators to intersect corresponding twelve divisions of the lead.
- Step3: Join the points for a simple harmonic helical curve.

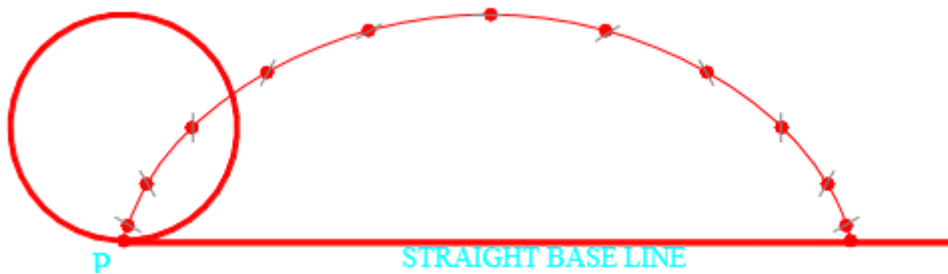


STRAND	GEOMETRY
SUB STRAND	ROLLING WHEEL
CONTENT LEARNING OUTCOME	Define different types of rolling wheels. Identify the rolling wheel and the base line. Name and differentiate between different types of rolling wheels
REFERENCE FROM TEXT BOOK	Page: 23 - 24

**ROLLING WHEELS**

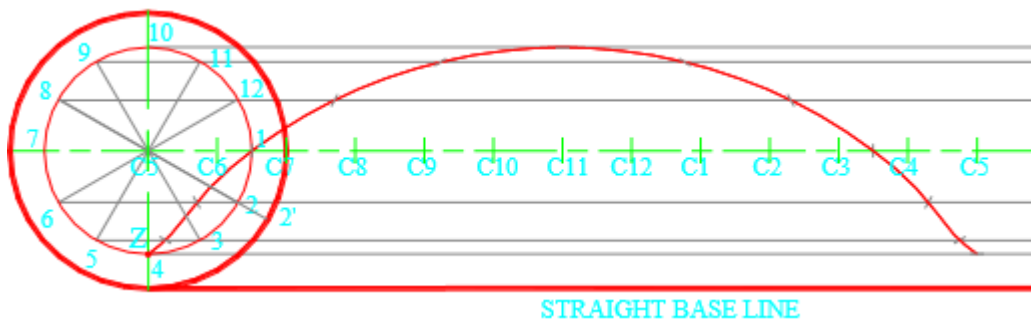
A cycloid is a locus generated by a point on the circumference of a circle as the circle rolls along a straight line without slipping. The moving circle is called the "Generating circle" and the straight line is called the "Directing line" or the "Base line". The point on the Generating circle which generates the locus is called the "Generating point."

**CYCLOID**



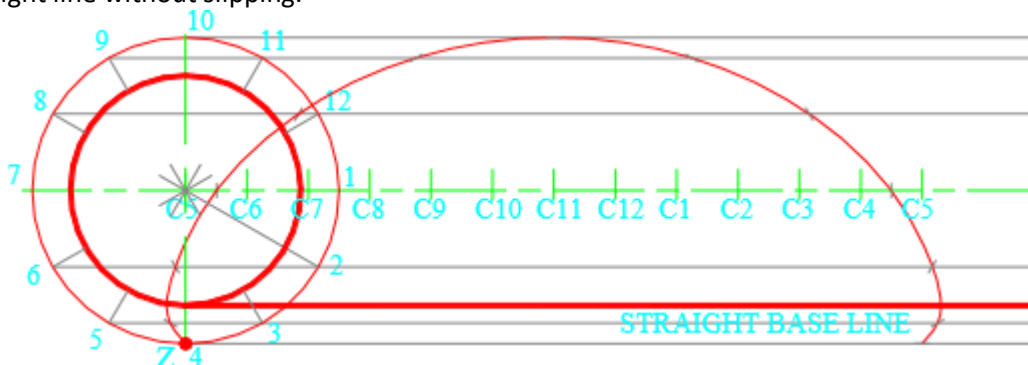
**WHAT IS AN INFERIOR TROCHOID?**

It is a locus of a point which lies inside the generating circle. The construction layout is similar to that of a cycloid; notice that the 'spokes' will lie in similar positions, but the radius is that of the generating circle.



**WHAT IS A SUPERIOR TROCHOID?**

A Superior Trochoid is the path or locus of a point which lies on the outside of a circle when it rotates along a straight line without slipping.



**SUVA SANGAM COLLEGE**  
**Year 11: TECHNICAL DRAWING**  
**WEEK 4**                      **DATE: 26/07 – 30/07/21**

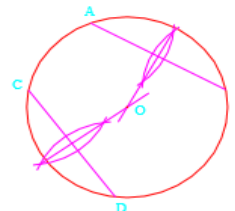
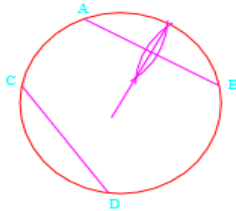
STRAND	GEOMETRY
SUB STRAND	CENTROID
CONTENT LEARNING OUTCOME	Define centroid and state its significance. Construct centroid of simple geometrical shapes. Apply the use of centroid in original articles
REFERENCE FROM TEXT BOOK	Page: 30 - 31

**CENTROID**

Centroids are the centre of an object or the centre of gravity. It is the point of intersection of all the medians. The centre of mass of a uniform object is also called a centroid.

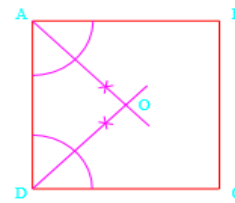
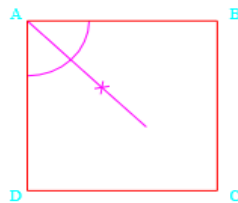
**How to find the centre of a circle?**

Draw two chords and bisect it. The intersection of the two bisectors is the centroid of the circle.



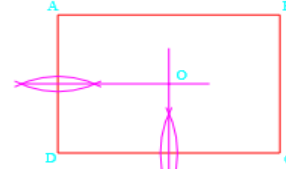
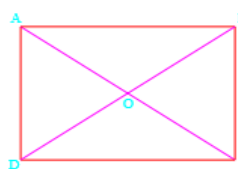
**HOW TO FIND THE CENTRE OF A SQUARE?**

Either bisect any two angles or join the diagonals to find the centroid of the square.



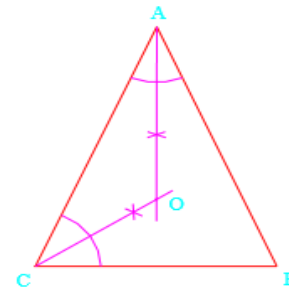
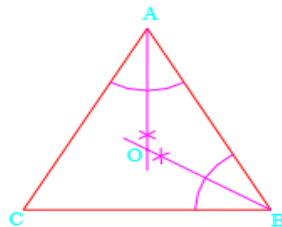
**HOW TO FIND THE CENTRE OF A RECTANGLE?**

Either join the diagonals or bisect two adjacent sides to find the centroid of the rectangle.



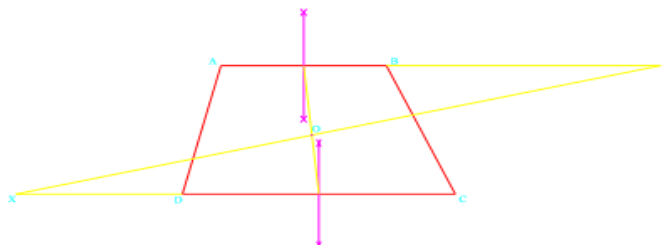
**HOW TO FIND THE CENTRE OF A TRIANGLE?**

Bisect any two angles of the triangle to find its centroid.



**HOW TO FIND THE CENTRE OF A TRAPEZIUM?**

1. Bisect the two parallel sides (AB & CD) and join the midpoints.
2. Extend the parallel sides. Add the length of the opposite side as shown, (AB = XD & CD = BY).
3. Join X and Y which will intersect the line joining the midpoints for the centroid, O.



STRAND	GEOMETRY
SUB STRAND	INSCRIBED AND CIRCUMSCRIBED
CONTENT LEARNING OUTCOME	Define inscription and circumscription. Inscribe and circumscribe geometrical shapes
REFERENCE FROM TEXT BOOK	Page: 12 - 13

**INSCRIBE AND CIRCUMSCRIBE**

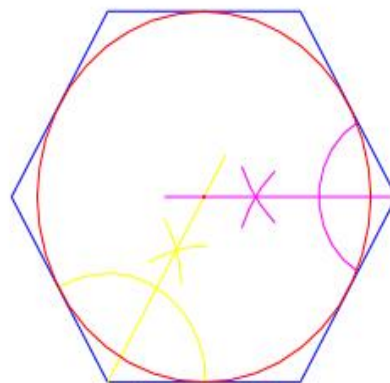
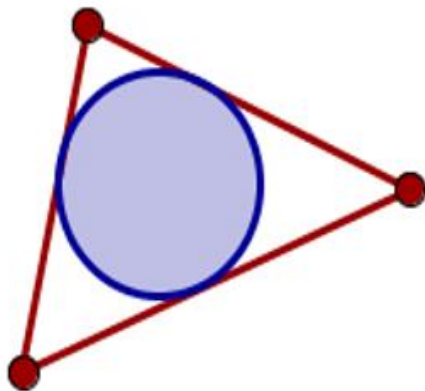
**Inscribe** means to draw something inside something else. In geometry it usually means drawing one shape inside another so that it just touches.

A **circumscribed** circle passes through all vertices of a plane figure and contains the entire figure in its interior. The center of this circle is called the circumcenter.

The word “inscribed” describes the inside shape, and the word “circumscribed” describes the outside shape.

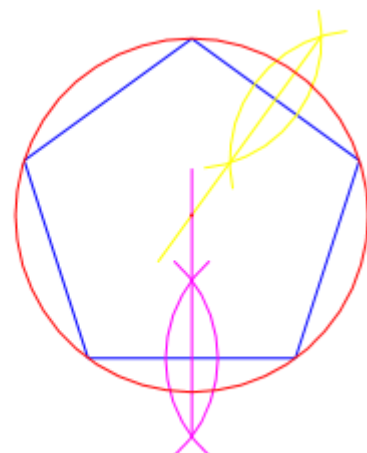
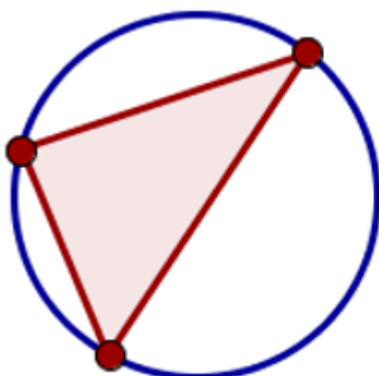
**THE INSCRIBED CIRCLE**

For example, the figures shown below is a circle inscribed in a triangle and hexagon.



**THE CIRCUMSCRIBED CIRCLE**

For example, the figures shown below is a circle circumscribing a triangle and a pentagon?



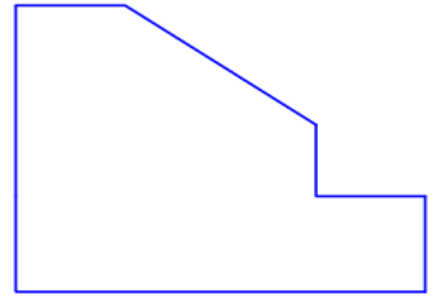
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**Year 11: TECHNICAL DRAWING**

**WEEK 1**

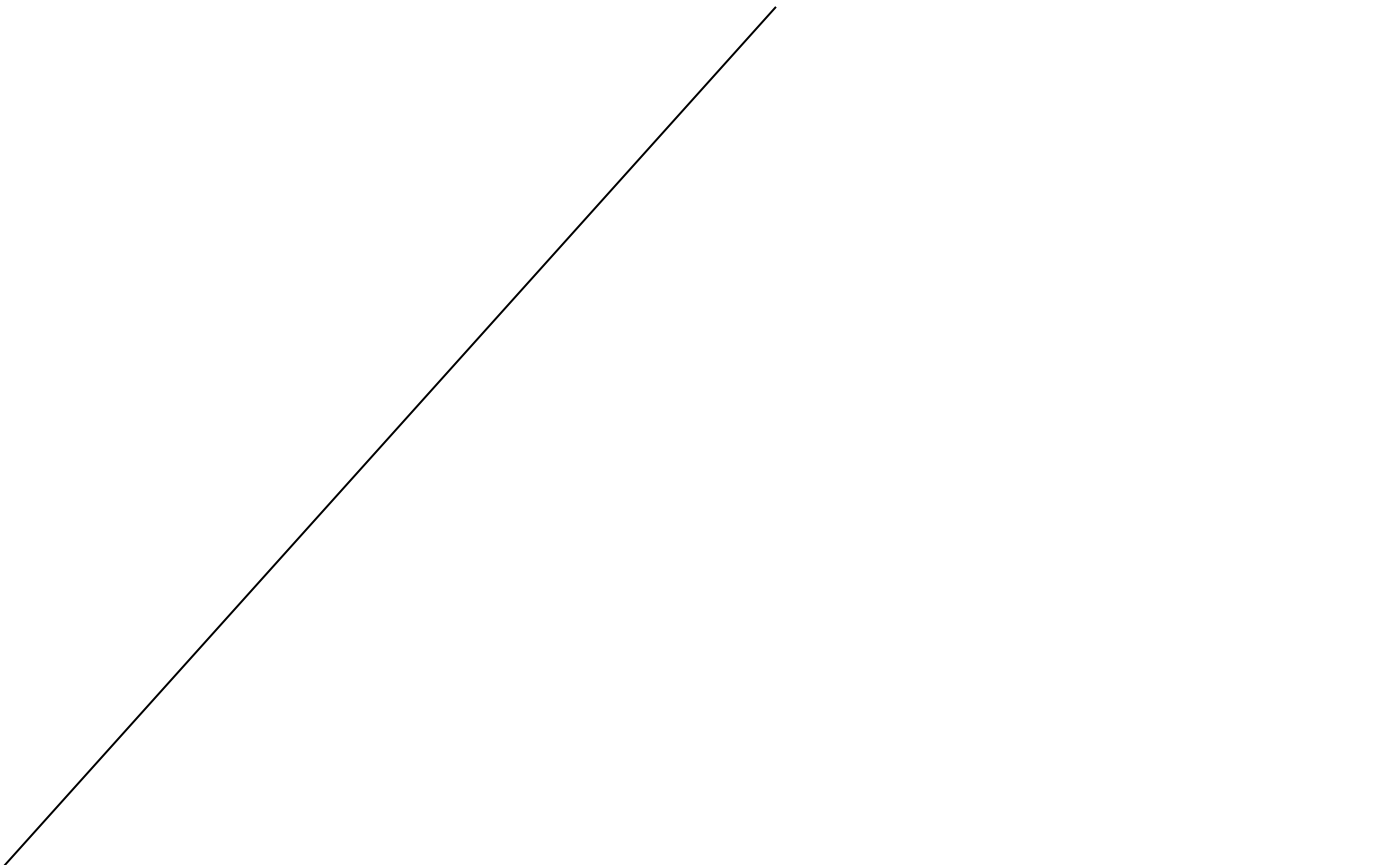
**DATE: 05/07 – 09/07/2021**

ACTIVITY

1. Given is shaped block in orthographic view.  
Using scale, construct an Isometric scale on the line given below and indicate all measurement on it.



2. Given the angle ( $45^\circ$ ) and the ratio of the vector lengths 12:8, construct a logarithmic scale.



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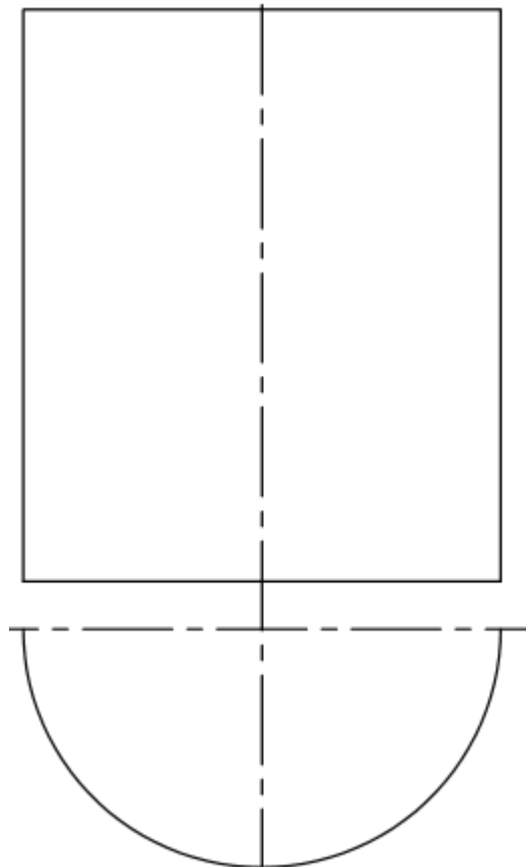
WEEK 2

DATE: 12/07 – 16/07/21

ACTIVITY

Given: The plan and elevation of a right hand helix

Required: Construct a simple right hand helical curve for 1 revolution

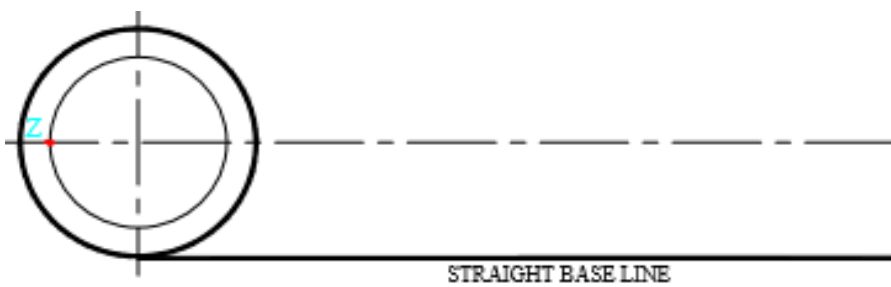




ACTIVITY

**Given:**            A car wheel with an air valve labeled as Z rolls on a horizontal highway without slipping.

**Required:**      Plot the locus of point Z as it makes 1 revolution.

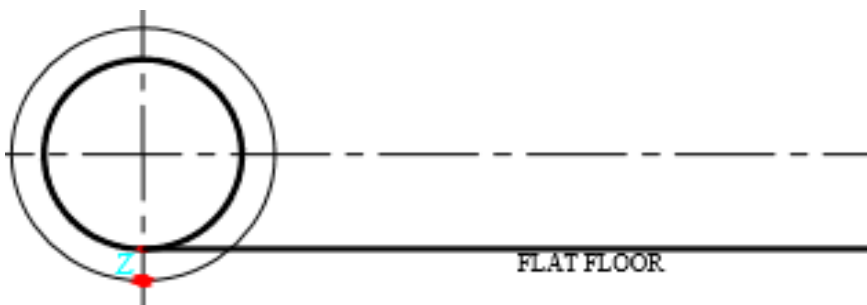


NOTE: Only one exercise given because they need enough time on the construction part.

ACTIVITY

**Given:** A tyre of a shopping trolley with a point Z rolls on a Flat and sloping floor without slipping for  $3/4$  revolution.

**Required:** Plot the locus of point Z as it makes one complete revolution.



ACTIVITY

ACTIVITY

Redraw and find the centroid of the following shapes?

