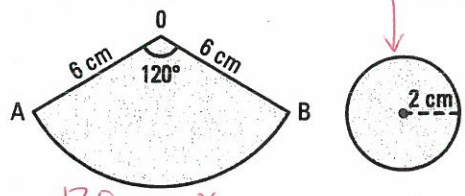
Net of a cone

Answer Key

ACTIVITY 4 Net of a cone (Constructing cones)

b) 2. circle with 2 cm radius

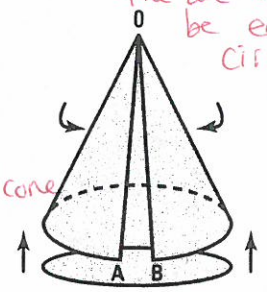
The net of a cone is composed of a circular sector and a disc.



a) Draw on construction paper
   1. a circular sector with a radius of 6 cm and a central angle measuring 120°.
   2. a disc with a 2 cm radius.

b) 1. Calculate the length of the arc AB. $\frac{a}{360} = \frac{\widehat{AB}}{2\pi s}$ $\frac{120}{360} = \frac{x}{2\pi 6}$ $x = 4\pi$ or 12.57 cm
   2. Calculate the circumference of the circle with a 2 cm radius. $2\pi r = 2\pi 2 = 4\pi$ or 12.57 cm
   3. Verify that the length of the arc AB is equal to the circumference of the circle. The length of the arc AB must be equal to circumference of the base

c) 1. Cut out the circular sector and fold it as illustrated on the right.
   2. Cut out the disc and glue it to the arc of the circular sector to complete the construction of the cone.

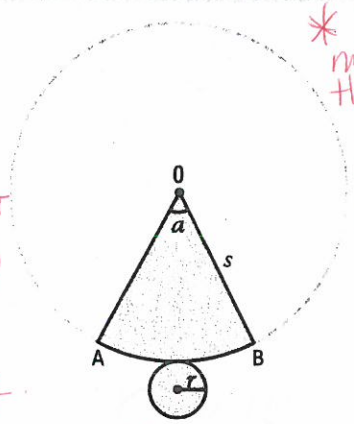


d) What do the following become for the cone?
   1. The surface of the circular sector AOB. The lateral surface of cone
   2. The radius of the circular sector AOB. The slant height of the cone

A B

ACTIVITY 5 Net of a cone (Finding the angle of the circular sector)

The net of a cone with slant height $s = 4$ cm and radius $r = 0.8$ cm is represented on the right.



* Recall: measure of the arc AB = circumference of the base.

a) 1. What can be said about the measure of the arc AB and the circumference of the cone's base? They are equal
   * 2. What is the measure of the arc AB? $2\pi r = 2\pi 0.8 = 1.6\pi$

b) Determine the circumference C of the large disc with radius s (represented as dotted). $2\pi 4 = 8\pi$

c) The central angle a, the measure of the arc AB and the circumference C of the large disc form the proportion:

$$\boxed{\frac{a}{360°} = \frac{m\widehat{AB}}{C}}$$

circumference of large disc

Determine the measure of the angle a using this proportion. $\frac{a}{360} = \frac{1.6\pi}{8\pi} = 72°$

d) Verify the proportion $\frac{a}{360°} = \frac{r}{s}$ ← small circle

radius of large circle (slant height of cone)

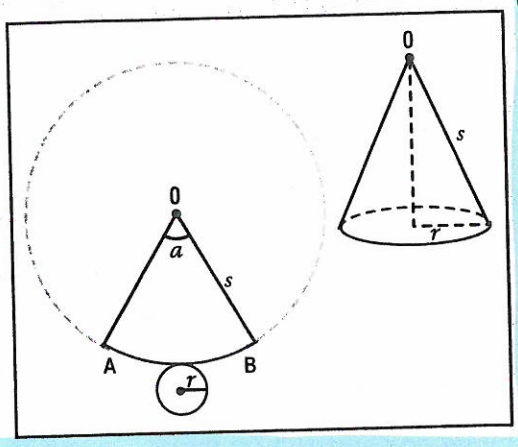
$\frac{72°}{360°} = \frac{0.8}{4}$ → True

* Formulas to Know

NET OF A CONE

- The net of a cone with radius r and slant height s includes:
  - a circular sector of radius s (slant height of the cone) and central angle a, representing the conical surface.
  - a disc of radius r, representing the base of the cone.
- The following proportions are obtained:

$$\boxed{\frac{a}{360^\circ} = \frac{m\widehat{AB}}{2\pi s}} \quad \text{and} \quad \boxed{\frac{a}{360^\circ} = \frac{r}{s}}$$



4. Complete the following table using the given net of a cone and the proportion $\frac{r}{s} = \frac{a}{360^\circ}$.

Here you need to use the two formulas. ① ②

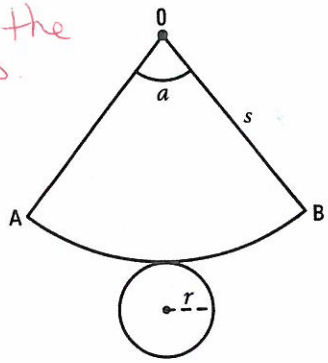
How to do first one

① $\frac{2}{s} = \frac{60}{360}$ $s = 12$

② $\frac{60}{360} = \frac{mAB}{2\pi 12}$

$mAB = 4\pi$

a (°)	r (cm)	s (cm)	$m\widehat{AB}$ (cm)
60°	2	12	4π
90°	3	12	6π
45°	0.5	4	π
30°	2	24	4π
45°	1	8	2π



5. Explain the procedure for constructing a cone with a 3 cm radius and height of 4 cm.

1. Find slant height $r^2 + h^2 = s^2$ $\sqrt{4^2 + 3^2} = \sqrt{25} = 5\text{cm}$
2. Find central angle of the circular sector
   $\frac{a}{360^\circ} = \frac{r}{s} \rightarrow \frac{a}{360} = \frac{3}{5} \rightarrow a = 216^\circ$
3. Draw this circular sector with a 5cm radius (slant height)
4. Draw a disc with a 3cm radium

Not drawn to scale →