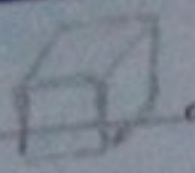
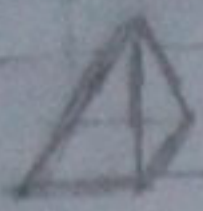
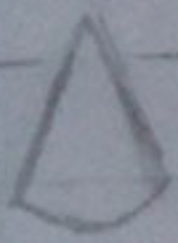
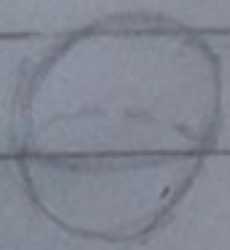

cube → square


pyramid → square


cylinder → circle


cone → circle


sphere → circle

Spaces and Volumes

A line has only one dimension: length. A square has two dimension: length and height. Some shapes have three dimension: length, height and width. Cubes, pyramids, cylinders, cones and spheres are three-dimensional shapes

Two-dimensional shapes have area. Three-dimensional shapes have Volume. Cuboid shapes are based on a square or a rectangle. the Volume is simply the area (L x h) times the Width. For ex: a cuboid which is 4cm x 3cm x 2cm has a Volume of 24 cubic centimetres (cc or cm^3)

A pyramid is often based on a square but the formula is a little more complicated. it is (L x h x W) ÷ 3. so a pyramid with a base of 4cm x 3cm and height of 3cm. has a Volume of 36 ÷ 3 = 12 cc

Some shapes are based on cylindrical, conical, spherical shapes are based on circles, so the formulas for Volume use the const (π)

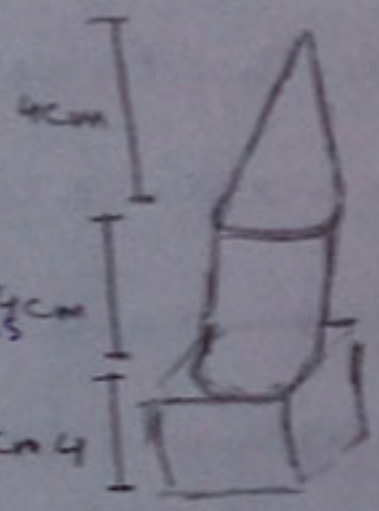
بعض قوانين المجسم:

- أسطوانة $\pi r^2 h$
- مخروط $\frac{\pi r^2 h}{3}$
- الكرة $\frac{4\pi r^3}{3}$
- الهرم $\frac{\text{قاعدة} \times \text{الارتفاع}}{3}$

* Look and complete the sentences

1) The bottom shape is a cube

2) the center shape is a cylinder

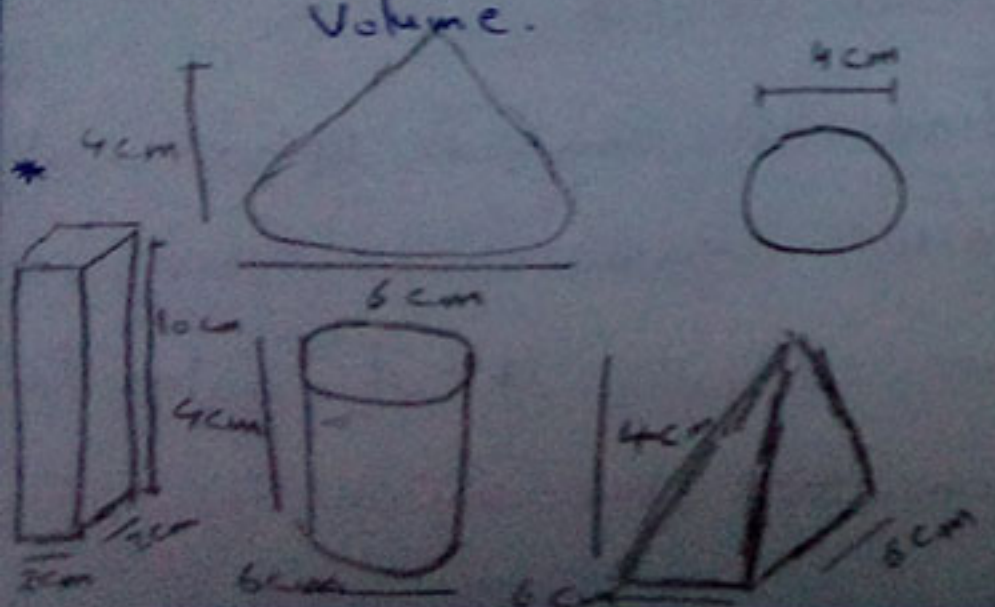


3) the Top shape is a cone

4) the height of the cylinder is 4cm

5) the radius of the cone is 2cm

6) the cone has the smalest Volume.



1) the Volume of the cone is 37.7 cm^3

2) the Volume of pyramid is 48 cm^3

3) the " " the spere is 33.515 cm^3

4) " " " cylinder is 113 cm^3

5) " " " cuboid is 40 cm^3

* write the noun for each adjective

1) cylindrical → cylinder
2) spherical → sphere
3) cuboid/cubic → cube
4) conical → cone
5) square → square
6) rectangular → rectangle
7) triangular → triangle
8) circular → circul

shapes for a new perfume bottle

A report

Introduction: the General Manager asked the Technical Department at look at possible bottle shapes for the new perfume, Moonlight, and to recommend the best shape.

Terms of reference, the new bottle has to fit into the existing packaging which is a cube of 4.5 cm sides - see figure 1.

the bottle therefore has to have maximum dimensions of 4 cm in any direction. The bottle has to hold 30 cc (cm^3) of perfume. The shape has to be interesting. the Design Department suggests a pyramid, a cylinder, a sphere or a cone. these shapes can be seen in Figure 2.

Figure 1:

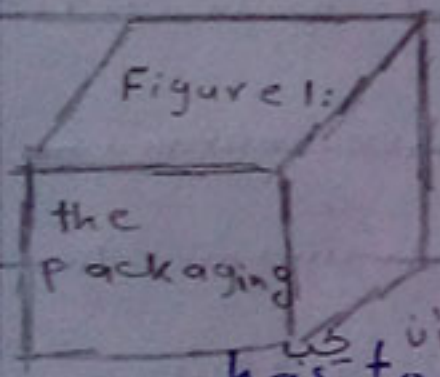
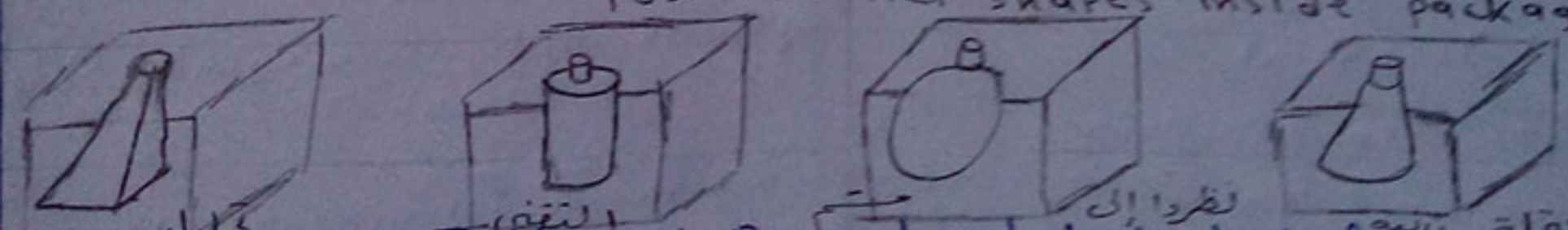


Figure 2:
Possible bottel shapes inside packaging



Analysis: the Technical Departmeat looked at four possible shapes and calculated the volume for the largest possible bottle of each shape. the result are shown in table 1

they then wrote a report.

shape	capacity
pyramid	21. cm^3
cylinder	50.3 cm^3
sphere	33.5 cm^3
cone	16.8 cm^3

table 1; cubic capacity of each shape

conclusion: the sphere is the only suitable shape for this size of packaging - see Table1
The cylinder holds far too much while the pyramid and the cone do not hold enough.
Recommendation: we should use a spherical shape for the new bottle we should not use a cylinder, cone or pyramid.

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choose the best answer in each case :

1- who is this report from?
a) the Design Department.
b) " technical "
c) the General Manger
d) we don't Know

2) what is the purpose of the report?
a) to recommend a bottle shape.
b) " suggest a package ".
c) " " possible bottle ".
d) to recommend a name for the perfume.

3) the report recommends using:
a) a sphere.
b) " cylinder.
c) " pyramid.
d) " cone

4) the pyramid is not suitable because:
a) it doesn't hold enough perfume
b) " holds too much perfume.
c) " doesn't fit in the packaging
d) the design Department doesn't like it.

---

* Find and correct the mistake:

1) the bottle has → have maximum dimensions of 4 cm in any direction.
2) the bottle have → has to hold 50cc of perfume.
3) the shape has being → has to be interesting.
4) we should to use a cylinder shape → we should not use a cylinder
5) we should not used → use the cylinder, cone or pyramid.

انتهت المحاضرة ...

Reem Al-Rahabi

Good luck ..