

SHARP

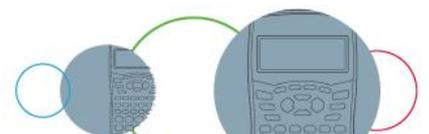
Worksheet 18: Measurement

Grade 10 Mathematics

1. Give the formula for the volume and surface area of each of the following solids:
 - a) sphere
 - b) pyramid with a square base
 - c) cone
 - d) cylinder
 - e) cube
 - f) rectangular prism
 - g) pyramid with an equilateral triangle base

2. For each of the following give the new formula for volume and surface area when the measurement given in brackets is multiplied by a factor of
 - i) 2
 - and
 - ii) k
 - a) sphere (r)
 - b) cone (r)
 - c) pyramid with a square base (l)
 - d) rectangular prism (b)
 - e) cube (l)
 - f) cylinder (r)
 - g) pyramid with an equilateral triangle base (l)

3. An ice cream cone is filled with a spherical scoop of ice-cream. The radius of the ice cream is 3cm and the height of the cone is 8cm.
 - a) If the ice-cream is deep-fried, what is the surface area that needs to be coated in batter?
 - b) What is the volume of ice cream that will be eaten?
 - c) If the ice-cream is placed into the cone so that just the top half of the scoop is visible, and the entire cone and ice-cream deep fried, what is the surface area that needs to be coated in batter?
 - d) What is the total volume of deep fried ice cream and cone that will be eaten?



4. A doll house is made up a rectangular prism with a square pyramid as its roof. The height of the house is 50cm and the width and length of the house is 70cm. The height of the roof is 20cm.
- If Thandi wants to paint the outside her doll house, what is the surface area that she would need to cover for both the roof and the walls?
 - Thandi's brother decides to fill the doll house with popcorn as a prank.
 - What is the volume of popcorn that he needs to make?
 - If the pot that he makes the popcorn has a diameter of 20cm and a height of 10cm, how much popcorn can he make in one pot?
 - How many pots of popcorn would he need to make in order to fill the doll house?
 - Thandi's mom is very upset by the prank and makes Thandi's brother turn the popcorn into a Christmas garland.
 - Assume that each piece of popcorn is in the shape of a sphere, with a diameter of 2 cm. How many pieces of popcorn would there be for the garland?
 - How long would the garland of popcorn be?
5. A rectangular milk carton, holds 2.1 liters of milk and $1\text{ml} = 1\text{cm}^3$. The base of the carton is a square.
- If the width of the carton is $\frac{1}{3}$ of the height, determine the width, length and height of the carton.
 - If the width and length of the carton is doubled, and the height remains the same, how much milk will the carton now hold?
 - If the height of the carton is halved, and the width and length are the same as in question a, how much milk will the carton hold.
 - If the milk is decanted into a cylindrical milk jug, with the same height as in question a, what will the radius of the jug be?
6. A rectangular box is filled with oranges. The box has length 21cm and height 42 cm, and a volume of $55\,566\text{ cm}^3$.
- What is the width of the box?
 - How much space would 4 boxes stacked together take up.
 - If the diameter of an orange is 7cm, what is the volume of one orange?
 - How many oranges would fit into 1 box?
 - What is the actual volume of air in the box, between the oranges?
 - If the oranges start to go off, and their volume shrinks by 20%, what is the diameter of the oranges now?

