

TEST YOURSELF

A. Objective Questions

1. Write *true* or *false* for each statement :

- (a) S.I. unit of temperature is fahrenheit. **False**
- (b) Every measurement involves two things - a number and a unit. **True**
- (c) Mass is the measure of quantity of matter. **True**
- (d) The S.I. unit of time is hour. **False**
- (e) The area can be expressed as the product of lengths of two sides. **True**

Ans: True : (b), (c), (e) False : (a), (d)

2. Fill in the blanks :

- (a) The S.I. unit of length is metre, of time is second, of mass is kilogram.
- (b) °C is the unit of temperature.
- (c) 1 metric tonne = 1000 kg.
- (d) The zero mark in Celsius thermometer is the melting point of ice.
- (e) The thermometer used to measure the human body temperature is called the clinical thermometer.
- (f) The normal temperature of human body is 37 °C or 98.6 °F.
- (g) The mass of an object is measured with the help of a beam balance.

Ans: (a) metre, second, kilogram (b) temperature
(c) 1000 (d) ice (e) clinical
(f) 37, 98.6 (g) mass.

3. Match the following columns :

Column A

Column B

- | | |
|------------------------------|---------------------|
| (a) Length of a housing plot | (i) Clock |
| (b) Breadth of a book | (ii) Beam balance |
| (c) Mass of an apple | (iii) Thermometer |
| (d) Period of time for study | (iv) Measuring tape |
| (e) Temperature of a body | (v) Graph paper |
| (f) Surface area of a leaf | (vi) Metre ruler |

Ans: (a)-(iv), (b)-(vi), (c)-(ii), (d)-(i),
(e)-(iii), (f)-(v)

4. Select the correct alternative :

- (a) The symbol of degree celsius is :
(i) °C (ii) °F
(iii) K (iv) °K
- (b) 10 mm is equal to :
(i) 1 cm (ii) 1 m
(iii) 10 dm (iv) 10 cm
- (c) The amount of surface occupied by an object is called its :
(i) volume (ii) area
(iii) mass (iv) length
- (d) A metre ruler is graduated in :
(i) m (ii) cm
(iii) mm (iv) km
- (e) A thermometer is graduated in :
(i) kelvin (ii) °C
(iii) g (iv) cm

Ans : (a)-(i), (b)-(i), (c)-(ii), (d)-(iii), (e)-(ii)

B. Short/Long Answer Questions

- What is measurement ? How is a measurement expressed ?
- State *two* characteristics of a unit.
- Name four basic measurements in our daily life.
- What are the S.I. units of (i) mass (ii) length (iii) time and (iv) temperature ? Write their names and symbols.
- Define one metre, the S.I. unit of length. State its *one* multiple and *one* sub multiple.
- Convert the following quantities as indicated :
(a) 12 inch = ft
(b) 1 ft = cm
(c) 20 cm =m
(d) 4.2 m = cm
(e) 0.2 km = m
(f) 0.2 cm = mm
(g) 1 yard = m

Ans: (a) 1 (b) 30.48 (c) 0.2 (d) 42
(e) 200 (f) 2 (g) 0.9

B. Short/Long Answer Questions.

1. What is environment measurement? How is a measurement expressed?

Ans: Measurement is a comparison of an unknown quantity with a known fixed quantity of the same kind.

The value obtained on measuring a quantity is called its magnitude. The magnitude of a quantity is expressed as numbers in its unit.

2. State two characteristics of a unit.

Ans: Two characteristics of a unit are:

a. It should be of convenient size.

b. It must be universally accepted, i.e. its value must remain same at all places and at all times.

3. Name four basic measurements in our daily life.

Ans: In our daily life, we measure the following four basic physical quantities:

a. Length

b. Mass

c. Time

d. Temperature

4. What are the S.I units of length (i) mass (ii) length (iii) time and (iv) temperature? Write their names and symbols.

Ans:

Ans: S.I units are as follows:

| Quantity | S.I unit | Symbol of S.I unit |
|------------------|----------|--------------------|
| (i) Length | metre | m |
| (ii) Mass | Kilogram | kg |
| (iii) Time | second | s |
| (iv) Temperature | Kelvin | K |

5. Define one metre, the S.I unit of length. State its one sub multiple.

Ans: One metre is defined as the distance travelled by light in air in $\frac{1}{299792458}$ of a second.

Multiple of a metre: kilometre

Submultiple of metre: Centimetre

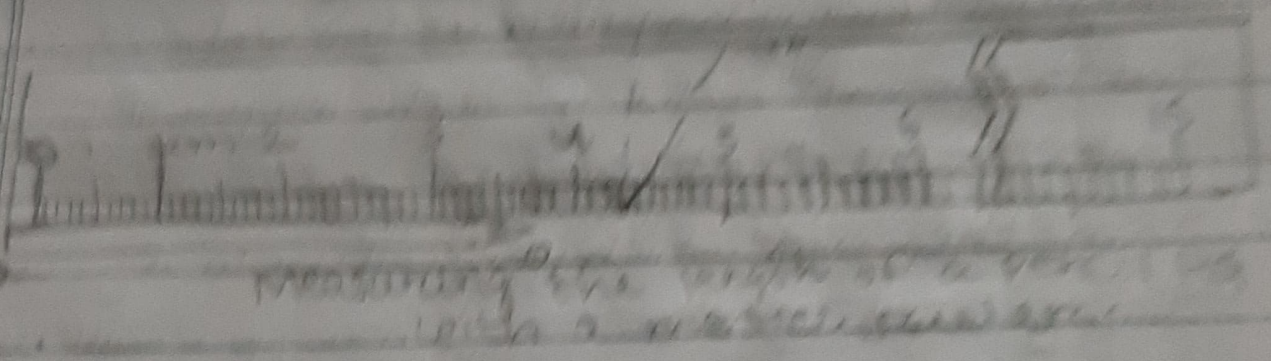
6. convert the following quantities as indicated:

- (a) 12 inch = 1 Ft
- (b) 1 feet = 30.48 cm
- (c) 20 cm = 0.2 m
- (d) 4.2 m = 420 cm
- (e) 0.2 km = 200 m
- (f) 0.2 cm = 2 mm
- (g) 1 yard = 0.91 m

7a Describe in steps how would you measure the length of pencil using a metre ruler. Draw a diagram if necessary.

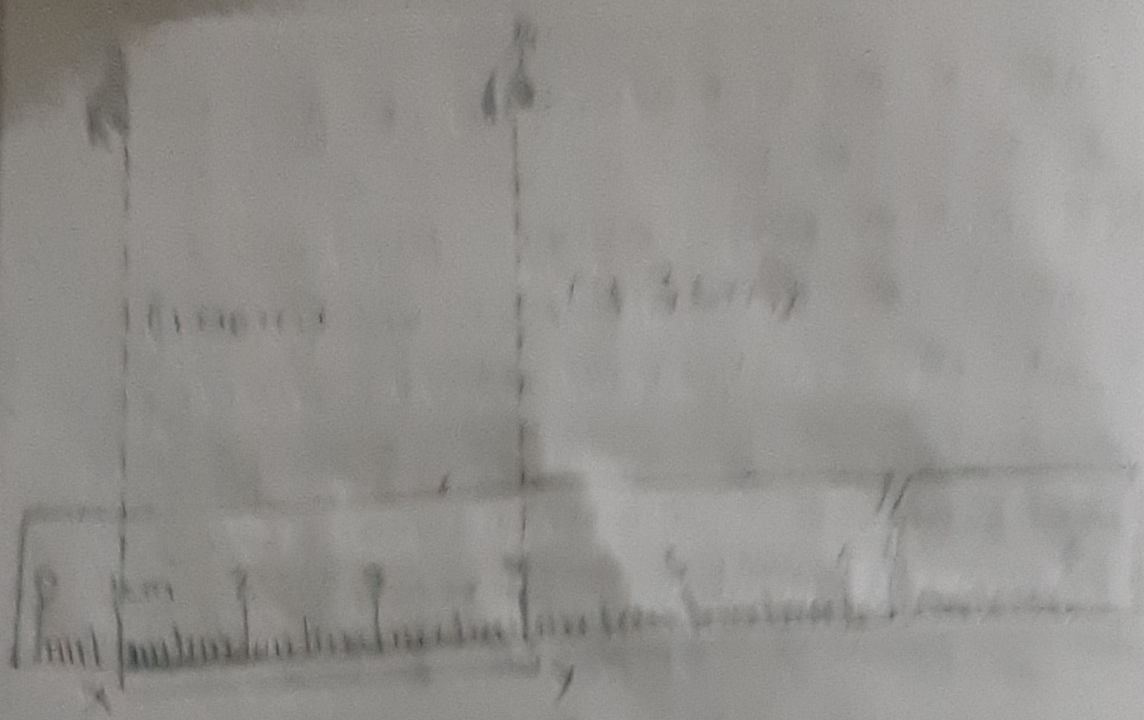
Ans: To measure the length of a pencil using a metre ruler

These are the marks on the ruler which are used to measure the length of an object. The marks are called as scale marks. The distance between two consecutive scale marks is called as the scale division. The smallest scale division on a ruler is called as the least count of the ruler.



b) Explain with an example how you will use the broken ruler in part (a) if the ends of the ruler are broken.

Ans: The ends of the ruler, broken, might get damaged with use and its zero mark may not be visible. To measure the length of an object with such a ruler, the object is placed close to a specific marking on the ruler and positions of both ends of the object are read on the ruler.

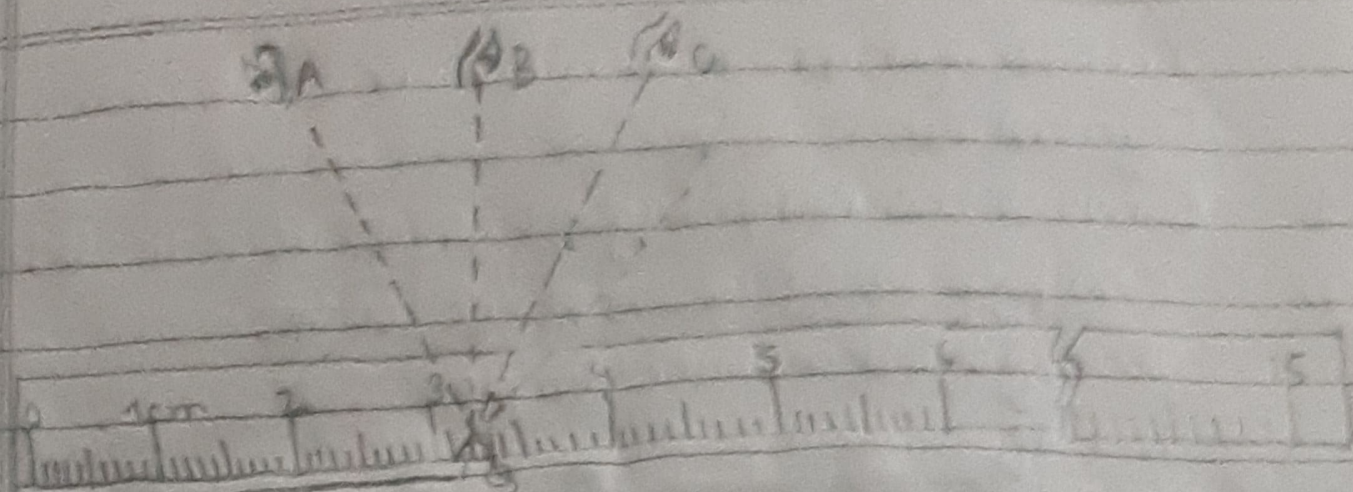


The difference of the two readings gives the length.
 In fig the reading on ruler at the end X is 1.0 cm, and at the end Y is 4.3 cm. So, the length of the rod XY is $4.3 - 1.0 = 3.3$ cm.

8. Name the device which you will use to find your play ground. Describe its steps how you will use it.

Ans: We will use a measuring tape of measure the perimeter of our play ground. To measure the length of playground the tape is spread along the length of the curved area.

9. The diagram below shows a stick placed along a metre ruler. The length of the stick is measured keeping the eye at positions A, B and C.



a) Write the ~~end~~ length of stick PQ as observed, for each position of the eye. Are they all same?

Ans: Length of stick PQ from

Position A = 3.4 cm

Position B = 3.2 cm

Position C = 3.00 cm

No they are not same.

b) Which is the correct position of the eye? write the correct length of the stick.

Ans: ~~The mass of a body is the quantity of matter~~

Ans: 'B' is the correct position of the eye. Correct length of the stick PQ = 3.2 cm

10. Define mass. State its (i) S.I. (ii) C.G.S and (iii) F.P.S units. How are they related?

Ans: The mass of a body is the quantity of matter contained in it. The S.I. unit of mass is: kilogram in short form it is written as kg.

In C.G.S system, the unit of mass is gram, (symbol g).

In F.P.S system, the unit of mass is pound
(symbol lb).

11 Convert the following quantities as indicated:

a $2500 \text{ kg} = \underline{2.5} \text{ metric tonne.}$

$$2500 \text{ kg} = 2.5 \text{ metric tonne}$$

$$1000 \text{ kg} = 1 \text{ metric tonne}$$

$$1 \text{ kg} = \frac{1}{1000} \text{ metric tonne}$$

$$\therefore 2500 \text{ kg} = \frac{1000}{1} \times \frac{1}{1000} \times 2500 \text{ metric tonne.}$$

$$\therefore 2500 \text{ kg} = 2.5 \text{ metric tonne.}$$

b $150 \text{ kg} = \underline{1.5} \text{ quintal}$

$$100 \text{ kg} = 1 \text{ quintal}$$

$$1 \text{ kg} = \frac{1}{100} \text{ quintal}$$

$$150 \text{ kg} = \frac{1}{100} \times 150 \text{ quintal}$$

$$= 1.5 \text{ quintal}$$

$$\therefore 150 \text{ kg} = 1.5 \text{ quintal}$$

$$10 \text{ lb} = \underline{4.5359} \text{ kg}$$

$$1 \text{ lb} = 453.59 \text{ g}$$

$$= 453.59 \times \frac{1}{1000} \text{ kg}$$

$$[\because 1 \text{ kg} = 1000 \text{ g}]$$

$$= 0.45359 \text{ kg}$$

$$\therefore 10 \text{ lb} = 0.45359 \text{ kg}$$

d $2500 \text{ g} = 2.5 \text{ kg}$

$1000 \text{ g} = 1 \text{ kg}$

$1 \text{ g} = \frac{1}{1000} \text{ kg}$

$\therefore 2500 \text{ g} = 2.5 \text{ kg}$

e $0.01 \text{ kg} = 10 \text{ g}$

$1 \text{ kg} = 1000 \text{ gm}$

$\therefore 0.01 \text{ kg} = 1000 \times 0.01 \text{ g}$

$= 1000 \times 1 \text{ g} = 10 \text{ g}$

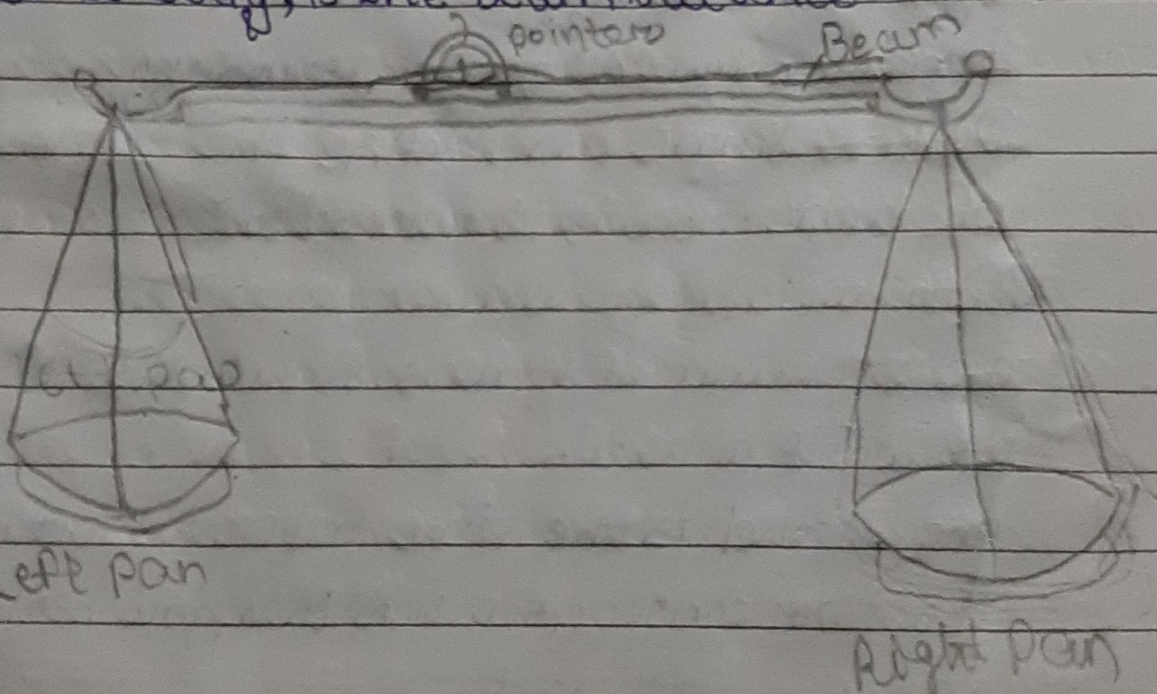
f $5 \text{ mg} = 5 \times 10^{-6} \text{ kg}$

$5 \text{ mg} = \frac{5}{1000} \text{ g}$ or $5 \times 10^{-3} \text{ g}$

$\frac{5}{1000} \text{ g}$ or $5 \times 10^{-3} \text{ g} = \frac{5}{1000 \times 1000}$ or $5 \times 10^{-6} \text{ kg}$

12 Name the instrument which is commonly used to measure the mass of a body, state how it is used.

Ans: Instrument commonly used to measure the mass of a body, is the beam balance.



When we hold up the balance, we observe that when there is nothing on either pan, the beam is horizontal. The body whose mass is to be measured is placed on the left pan. The standard weights are put on the right pan. They are so adjusted that the beam is again horizontal on holding the balance up. The total of the standard weights gives the mass of the given body.

Define one kilogram, the S.I. unit of mass. How is it related to (i) quintal (ii) metric tonne and (iii) gram?

The mass of 1 litre of water at 4°C is taken as 1 kilogram.

$$1 \text{ quintal} = 100 \text{ kg}$$

$$1 \text{ metric ton} = 10 \text{ quintal} = 1000 \text{ kg}$$

Define Name and define the S.I. unit of time. How is it related to (i) minute (ii) hour (iii) day and (iv) year

The S.I. unit of time is second. In a short form we write it as 's'.

One second is the time interval between the two consecutive ticks that you hear from pendulum wall clock.



$$1 \text{ min} = 60 \text{ s}$$

$$1 \text{ day} = 24 \text{ h} = 86400 \text{ s}$$

$$1 \text{ h} = 60 \text{ min} = 3600 \text{ s}$$

$$1 \text{ year} = 365 \text{ days} = 3.15 \times 10^7 \text{ s}$$

15. Name two devices used to measure the short time interval of an event.

Ans: Two devices used to measure the time interval of an event are: 1. stop watch 2. stop clock

16. Express in seconds (i) 3 minute 15 second, and (ii) 5 hour 2 minute 5 second.

Ans: (i) 3 minute, 15 second = 4 minute = 60 second

$$3 \text{ minutes } 15 \text{ second} = 60 \times 3 + 15 = 180 + 15 = 195 \text{ seconds}$$

(ii) 5 hour 2 minute 5 second

$$1 \text{ minute} = 60 \text{ second}, 2 \text{ minutes} = 60 \times 2 = 120 \text{ seconds}$$

$$1 \text{ hour} = 3600 \text{ second}, 5 \text{ hour } 3600 \times 5 = 18000 \text{ second}$$

$$5 \text{ hour } 2 \text{ minutes and } 5 \text{ seconds}$$

$$= 18000 + 120 + 5 = 18125 \text{ seconds}$$

17. What does the temperature measure?

Ans: Temperature measures the degree of coldness and hotness of a body.

18. Name the (i) S.I. unit and (ii) one common unit of temperature. Write their symbols.

Ans: The S.I. unit of temperature is ~~measured with~~ kelvin (symbol K)

Common unit of temperature is degree centigrade (symbol °C)

19.

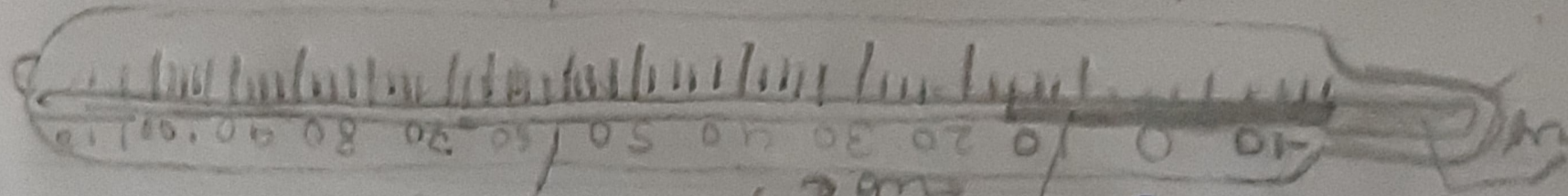
Name the instrument used for measuring the temperature of a person. Draw its neat labelled diagram.

Ans:

The temperature is measured with a thermometer.

laboratory

also



stem

capillary tube

rod reservoir



20. Write the temperature of (i) melting ice (ii) boiling water.

Ans. The temperature of (i) melting ~~point~~ ice = 0°C
(ii) boiling water = 100°C

What is a clinical thermometer? state its special features. Draw a neat labelled diagram of a clinical thermometer showing the range of temperature marked on it.

Doctors use a special thermometer called the clinical thermometer for measuring the temperature of the patient's body. This thermometer has the markings from 35°C to 42°C . It has a slight bend or kink on the stem just above the bulb. This kink is called the constriction. This constriction prevents the mercury from falling back all by itself. The temperature of a healthy person is 37°C . This temperature is marked by a red arrow.

Thermometer.

Red Antidote



Bulb construction

capillary

clinical thermometer tube

22. What is the normal temperature of the human body? How is it indicated in a clinical thermometer?

Ans: Normal temperature of a human body is 37°C or 98.6°F .

To measure the temperature of a patient's body, its bulb is kept either below the tongue or under the arm's pit of the patient for about a minute. Then the thermometer is taken out and its reading is noted. When the temperature of a human patient's body is above 37°C , he/she is said to suffer with fever.

23. Can a clinical thermometer be used to measure the temperature of boiling water? Give reason for your answer.

Ans: No, a clinical thermometer cannot be used to measure the temperature of a boiling water.

The reason are:

- It has a very small range.
 - It can break on cooling and on excess heating.
24. Explain the term 'area of a surface'.

The total surface occupied by an object is called area or surface area. Name the S.I. unit of area and define it. The S.I. unit of area is square metre or metre^2 which in short form is written as m^2 .

How are the units (i) square yard (ii) hectare (iii) km^2 (iv) cm^2 (v) mm^2 related to the S.I. unit of area?

Square yard: One square yard is the area of a square of each side 0.9144m.
 $1 \text{ square yard} = 1 \text{ yard} \times 1 \text{ yard}$
 $= 0.9144\text{m} \times 0.9144\text{m}$
 $= 0.836\text{m}^2$ (or 0.84m^2 nearly)

Explain

Hectare: One hectare is the area of a square of each side 1 kilometre. Thus
 $1 \text{ hectare} = 1000 \text{ metres} \times 1000 \text{ metres}$
 $= 1000000\text{m}^2$ (or 10^6m^2)

km^2 : One kilometre square is the area of a square of each side 1 kilometre, Thus
 $1 \text{ km}^2 = 1 \text{ km} \times 1 \text{ km} = 1000 \text{ m} \times 1000 \text{ m} = 10^6\text{m}^2$

(iv) $\text{cm}^2 : \text{km}^2 = \left[\frac{1}{100} \text{ m} \right] \times \left[\frac{1}{100} \text{ m} \right] = \frac{1}{10000} \text{ m}^2$
 $= 10^{-4} \text{ m}^2$

(v) $\text{mm}^2 : \text{km}^2 = 10^{-6} \text{ m}^2$

27. Explain how you will measure the area of
(i) a square (ii) a leaf?

Ans: The area of a square can be calculated by using the following formula:

1- Area of square of side l
= side \times side
 $= l \times l = l^2$

2- The Area of a leaf is obtained by using a graph paper. A graph paper has small square of each side 1mm. The area of each big square is 1 cm^2 .

Procedure: Place the leaf on graph paper. Draw its outline on the paper and remove it.

Now count the number of complete squares. To this add the number of incomplete squares which are half or more than half. Ignore the squares which are less than half.

Thus, Approximate area = (Number of complete squares + Number of half or more than half of incomplete squares) \times area of one square.