

08. In the number pattern 8 , 16 , 24 , 32 ,

- i. What is the first term?
- ii. What is the fourth term?
- iii. Find it the 6th term ?
- iv. Which term is 136 ?

09. 11, 22, 33, 44, ... What is this pattern? What is the general term of this pattern?

10. Write first four terms of the following number patterns. Then write down the general term in each of them.

- i. The number pattern of the even numbers starting from 2
- ii. The number pattern of the odd numbers starting from 1
- iii. The number pattern of the square numbers starting from 1
- iv. The number pattern of the triangular numbers starting from 1
- v. The multiples of 4 starting from 4 and written in ascending order.
- vi. The multiples of 6 starting from 6 and written in ascending order.
- vii. The multiples of 10 starting from 10 and written in ascending order.

11. In the number pattern of the multiples of 7 starting from 7 and written in ascending order, with general term $7n$,

i. what is the 5th term?

ii. what is the 11th term?

iii. which term is 84?

iv. Is 43 a term of this number pattern? What are the reasons for your answer?

12. In the number pattern with general term $9n$

i. Write down 1st four terms of the number pattern

ii. what is the 11th term?

iii. which term is 108 ?

13. In the number pattern 1, 4, 9, 16, ...

i. What is the general term?

ii. Find is the 6th term ?

iii. Which term is 196 ?





14. In the Number pattern 1,3,5,7,.....

i. Write the next two terms

ii. Complete the table to obtain the general term of the number pattern

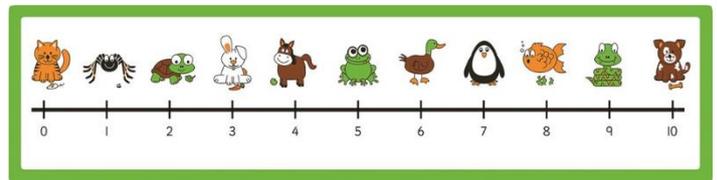
Term	multiples of 2	multiples of 2-1	Number
1 st Term	2x1	2x1-1	1
2 nd Term	2x2	2x2-1	3
3 rd Term	2x3	2x3-1	5
4 th Term	2x4	2x4-1	7
n th Term	2xn	2xn-1	2n-1

iii. Which term is 45?

iv. Write the general term of that number pattern

v. When we add the first term, first two term, first three terms.....and so on. we can get another number pattern. Write down that number pattern

15. Kumar starts to save money from saving one rupee on first day Rs.3 on second day, Rs.5 on the third day and it is continued to buy a book. If he bought the book with the total collection of 20 days, Find the price of the book.



16. In the number pattern of multiples of 3 starting from 3 and written in ascending order,
- Write the general term.
 - Find the 11th term?
 - Which term is 204?
 - 118 is a term of this number pattern ? What is the reason for your answer?
17. (a) Write down the first four terms of the triangular number pattern.
- (b) Write down the general term of the triangular number pattern
- (d) What is the 19th triangular number?
- (e) Which triangular number is 51×25 ?
18. (a) Write down the first four terms of the square number pattern.
- (b) Write down the general term of the square number pattern.
- (c) What is the 9th square number ?
- (d) Which square number is 625?



❖ Past paper questions (Number patterns)

01. A number pattern is made by attaching beads as shown below.



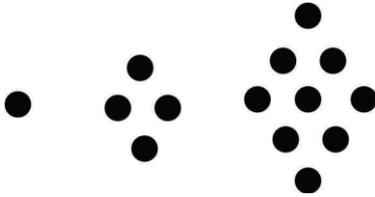
- i. Draw the next pattern.
- ii. Write the terms of the number pattern.
- iii. Find the general term.
- iv. How many beads are needed to make 10th stage of this pattern?
- v. Which stage of this pattern can be made by attaching 31 beads

02. Draw next pattern of this creations.



- i) Write down the number of triangles in each figure of the above pattern in order .
- ii) Find the general term of the number pattern.
- iii) Find the total triangles of 30th pattern by using general term.

03.



(i) Draw next two figures according to the above dot pattern. (2 marks)

(ii) Write the number of dots in each figure of the above pattern in order. (2 marks)

(iii) Find the general term of the number pattern. (2 marks)

(iv) Find the value of 20th pattern by using the general term. (2 marks)

(v) State whether a figure can be formed by using 81 dots in the above pattern. Give reason. (2 marks)

04. a) Consider the odd number pattern starting from one.

(i) Write down the common term. (2 marks)

(ii) Find the 20th term. (2 marks)

(iii) Which term is 109? (2 marks)

(iv) Find the position of the largest odd number less than 200 in this number pattern. (2 marks)

b) Kumar starts to save money from saving one rupee on first day Rs.3 on second day, Rs.5 on the third day and it is continued to buy a book. If he bought the book with the total collection of 20 days, Find the price of the book. (2 marks)

03. The perimeter of a square shaped tile is 80cm. Find its length of a side.

04. The width of a rectangular car park is 50m and its perimeter is 360m. Find its length.

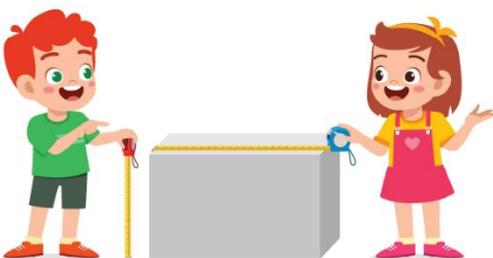
05. A rectangle is made by unfolding a wire frame which has the shape of equilateral triangle with side length is 18 cm. If the breadth of the rectangle is 7 cm, find the length of the rectangle?

06. Mr.Kasun intends to make a fence around his land with a perimeter of 400m.If the gap between two consecutive wire poles is 10 m, find the number of wire poles he will need.

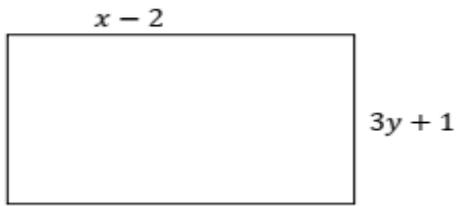
07. The length of a rectangular shaped building is twice of its width.

i. If its perimeter is 240m, calculate its length and width.

ii. The owner of the building is intended to arrange square shaped tiles to the floor. If the perimeter of a square shaped tile is 4m, how many tiles are needed?

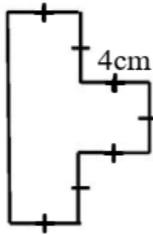


08. Write an algebraic expression for the perimeter of the given rectangle.

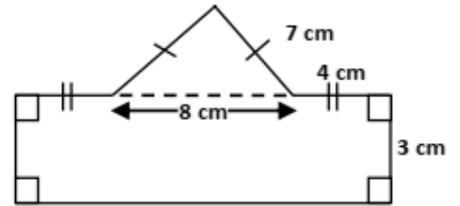


09. Find the perimeter of the following figures.

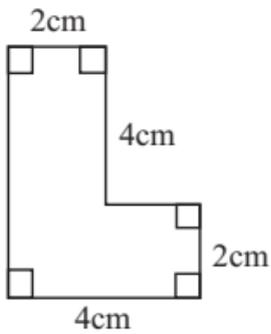
i.



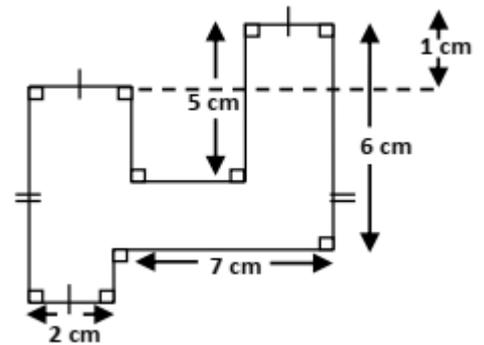
ii.



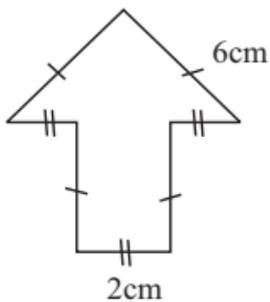
iii.



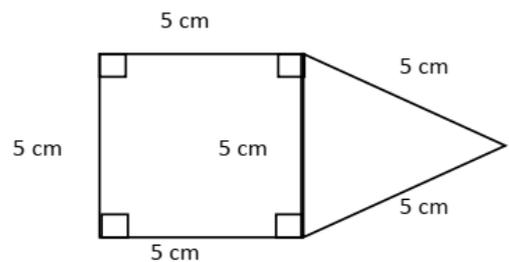
iv.



v.

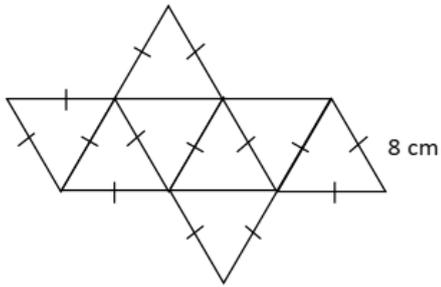


vi.

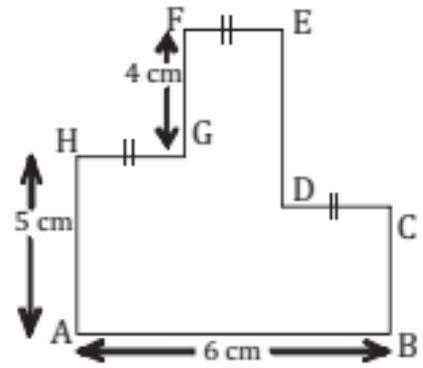


10. Find the perimeter of the following figures.

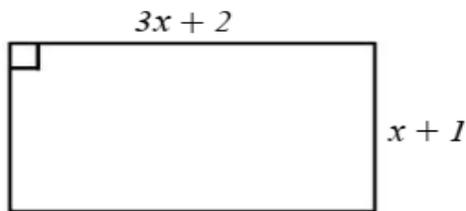
i.



ii.



11. i) Write the perimeter of the rectangle in the figure as an algebraic expression and give your answer in its simplest form.



ii) If its perimeter is 78cm, then find the value of x

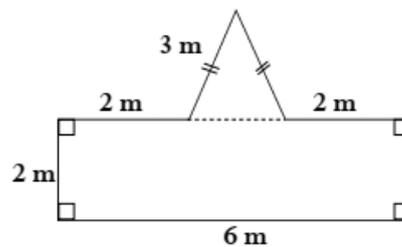
iii) Find the length and breadth of the rectangle.

12. A and B are two parts of metallic wire with equal lengths of 48cm.



- i. Student makes a equilateral triangle using the wire A . Draw a rough sketch of this triangle and mark the lengths of its side
- ii. Then the student makes a rectangle using the wire B. The length of that rectangle is 16cm. Draw a rough sketch of this rectangle and mark its sides.
- iii. Student makes a combined plane figure, by removing one side of the triangle in (i) and joining the rest to the length side of the rectangle in (ii). Draw the rough sketch for this combined figure and find the perimeter of it.

13. Figure show a flower bed in the garden, red flowers grow in the triangle shape area and yellow flowers grow in the rectangle shape area.

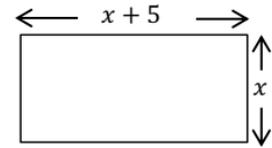


- (i) Find the Perimeter of the triangular shape red colored flower bed
- (ii) Find the Perimeter of the rectangular shape yellow colored flower bed
- (iii) A worker walked only around the flower bed for watering at once per day.
Calculate the total distance he walked during a day?



❖ Past paper questions (Perimeter)

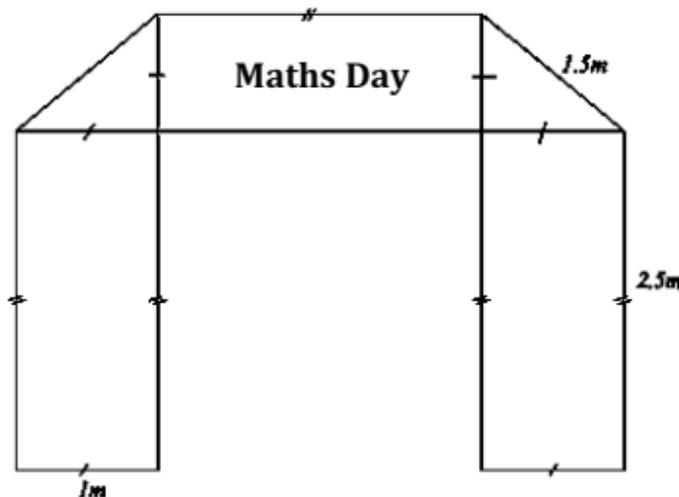
01. Rectangular land with length is $x+5$ and width is x shown in the figure



i) Write an algebraic expression for the perimeter .

ii) If perimeter of this land is 50m. Then find and length.

02. The below picture shows a pandal (Thorana) which was created by grade 8 students in a certain school for their “Maths Day” celebration.

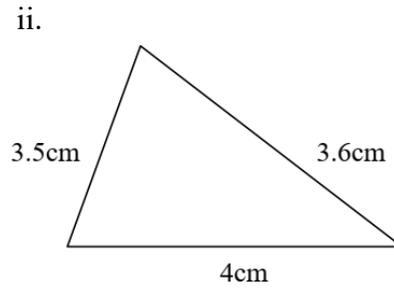
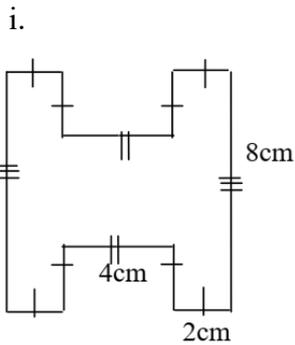


i. Find the perimeters of a triangular Part.

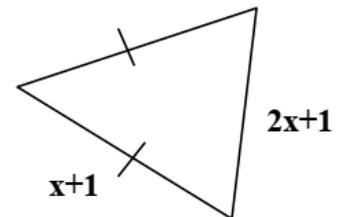
ii. Write the name of the shape of a plane figure, Which is obtaining by joining two types of shapes in the given figure

iii. Find the minimum length of a ribbon to fixe around the rectangular part which is written “Maths Day”

03. a) Calculate the perimeters of the following figures



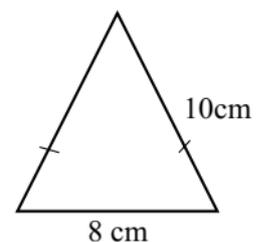
b) i) Write the perimeter of the triangle in the figure as an algebraic expression and give your answer in simplest form.



ii) If its perimeter is 31cm Find the value of x .

iii) Find the length of the longest side of this triangle.

c) Figure shows a triangle made using rubber on a nailed board. A square can be made on 4 nails using the same rubber band, with the same perimeter as in the triangle. Find the side length of it.



04. a. Find the magnitude of the complement of each of the angles given below..

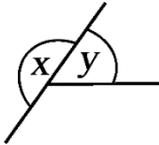
- i. 80° ii. 30° iii. 15° iv. 75° v. 10° vi. 89°

b. Find the magnitude of the supplement of each angle given below.

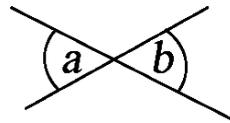
- i. 85° ii. 100° iii. 179° iv. 75° v. 15° vi. 1°

05. Select which of the following angles is a pair of adjacent angles?

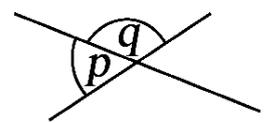
i.



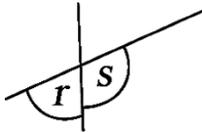
ii.



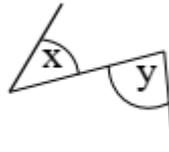
iii.



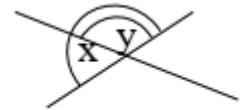
iv.



v.



vi.



06. Draw the following angles by using a Protractor

i. $\hat{A}BC = 25^\circ$

ii. $\hat{P}QR = 145^\circ$

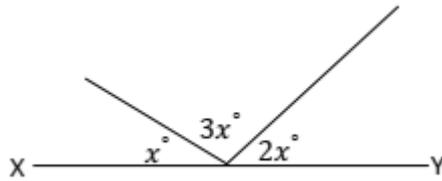
iii. $\hat{X}YZ = 210^\circ$

iv. $\hat{C}DE = 95^\circ$

v. $\hat{M}NO = 315^\circ$

vi. $\hat{D}EF = 280^\circ$

07. XY is a straight line.

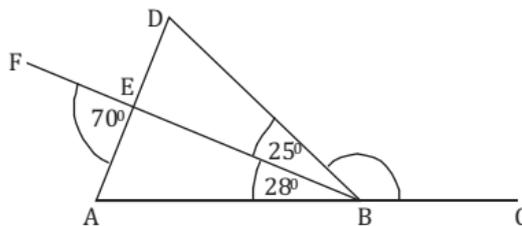


(a) Find the value of x , Give reasons.

(b) Find the complement of x° .

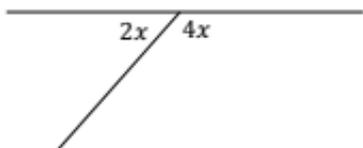
08. AC, AD and BF are straight line segments in the given figure.

Find the magnitudes of \hat{BED} and \hat{DBC} by giving reasons.

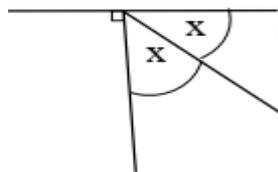


09. Find the value of x

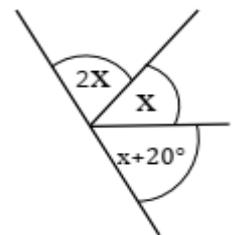
i.



ii.



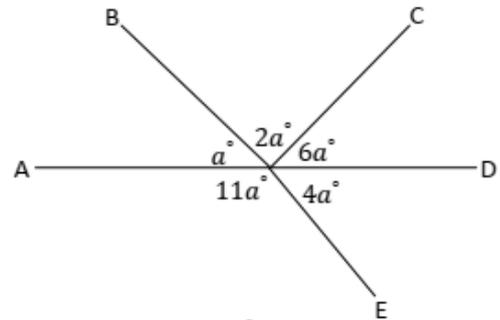
iii.



❖ Past paper questions (Angles)



01. i. Find the value of a° . Give reasons.



ii. Name a pair of supplementary angles

02. Answer the following questions according to the information given in the figure

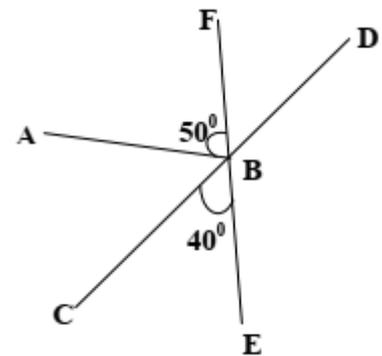
(CD and EF are straight lines)

i. Name a pair of vertically opposite angle.

ii. Find the magnitude of \widehat{DBF}

iii. Name a pair of supplementary angles

iv Find the magnitude of \widehat{ABC}



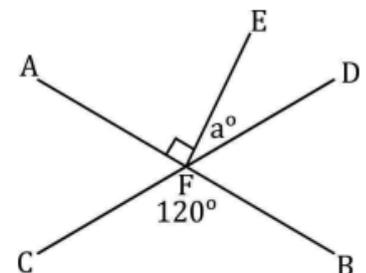
03. AB and CD are two straight lines segments intersected each other. Based on the given figure

i . Name the supplementary angle of \widehat{AFE}

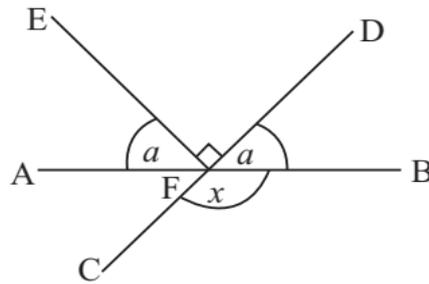
ii. Name an angle which has an equal magnitude to \widehat{AFD}

iii . Find the value of \widehat{EFD}

iv . Write down three properties of a pair of adjacent angles



04.



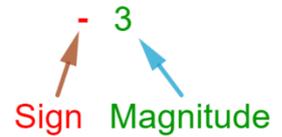
- a) i. Name a pair of vertically opposite angles. (01 marks)
- ii. Find the value of a (02 marks)
- iii. Find the value of x (02 marks)
- iv. "x and a is a pair of supplementary angles." Do you agree with this statement? Give reasons. (02 marks)
- b) What are the 3 essential requirements needed to name a pair of angles as a pair of adjacent angles. (03 marks)

Grade 8

Mathematics

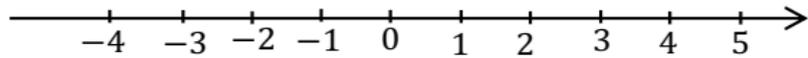
Unit - 04

04. Directed Numbers

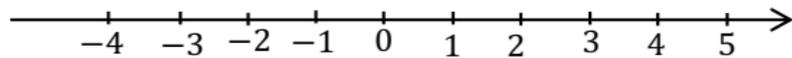


01. Find the value of each of the following by using the number line.

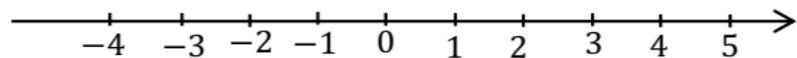
i. $(+2) + (+3)$



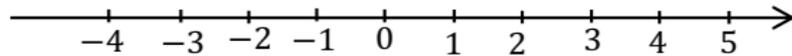
ii. $(+1) + (-4)$



iii. $(-3) + (+2)$



iv. $(-3) + (-1)$



02. Find the value of each of the followings

i. $(+1) + (+4)$

ii. $(-3) + (+4)$

iii. $(+6) + (-4)$

iv. $(-4) + (-5)$

v. $(0) + (-3)$

vi. $(+4) + (0)$

vii. $(-3) + (0)$

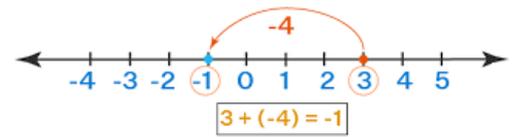
viii. $(-1) + (+1)$

ix. $(+5) + (-3)$

x. $(+\frac{3}{8}) + (+\frac{2}{8})$

xi. $(+\frac{7}{12}) + (-\frac{5}{12})$

xii. $(-\frac{5}{9}) + (-\frac{2}{9})$



01. Subtract each of the following by using the number line.

i. $(+4) - (+3)$

ii. $(+3) - (-2)$

iii. $(-3) - (+1)$

iv. $(-3) - (-4)$

✓ $15 - 19 = (-4)$

✗ $15 - 19 = 4$

02. Simplify.

i. $(+4) - (+6)$

ii. $(-5) - (+3)$

iii. $(+8) - (-5)$

iv. $(-6) - (-7)$

v. $(0) - (-2)$

vi. $(+6) - (0)$

vii. $(-2) - (0)$

viii. $(-3) - (+1)$

ix. $(+4) - (-2)$

x. $\left(+\frac{1}{6}\right) - \left(+\frac{1}{6}\right)$

xi. $\left(+\frac{6}{11}\right) - \left(-\frac{5}{11}\right)$

xii. $\left(-\frac{5}{8}\right) - \left(-\frac{2}{8}\right)$

03. Write the additive inverse of the following numbers.

i. (-4)

ii. $(+6)$

iii. (-1.5)

iv. (2.4)

v. (5)

vi. $(+1)$

vii. $\left(-\frac{1}{2}\right)$

viii. (-4)

04. Simplify.

i. $(+4) - (-2) + (+1)$

ii. $(+5) + (-3) - (+4)$

iii. $(+6) + (-4) + (0)$

iv. $(+7) + (-5) - (+6)$

v. $(-8) + (-4) + (-2)$

vi. $(-12) + (-6) - (0)$

vii. $(-6) + (-3) + (-1)$

viii. $(-10) + (-5) - (-10)$

05. Simplify.

i. $(+4) \times (-2)$

ii. $(+6) \times (+2)$

iii. $(-6) \times (-2)$

iv. $(-8) \times (+2)$

v. $(-6) \times (0)$

vi. $(+5) \times (0)$

06. Simplify.

i. $(+6) \times (-1) \times (+2)$

ii. $(+4) \times (-2) \times (+2)$

iii. $(-5) \times (-3) \times (0)$

iv. $(-6) \times (-2) \times (-1)$

v. $(-5) \times (-4) \times (-2)$

vi. $(-10) \times (+6) \times (0)$

07. Simplify.

i. $(+8) \div (+2)$

ii. $(-16) \div (+4)$

iii. $(+12) \div (-6)$

iv. $\frac{(+6)}{(-2)}$

v. $\frac{(-12)}{(-6)}$

vi. $\frac{(-10)}{(-5)}$

vii. $\frac{(+12)}{(+2)} \div \frac{(+8)}{(+4)}$

viii. $\frac{(+24)}{(-8)} \div \frac{(-12)}{(+4)}$

ix. $\frac{(+20)}{(-2)} \div \frac{(-10)}{(+2)}$

x. $\frac{(+24)}{(+2)} \div \frac{(+12)}{(+4)}$

xi. $\frac{(+32)}{(-8)} \div \frac{(-16)}{(+4)}$

xii. $\frac{(+100)}{(-2)} \div \frac{(-50)}{(+2)}$

08. Simplify.

i. $\frac{(+4) \times (-2)}{(-2)}$

ii. $\frac{(+6) \times (+3)}{(-2)}$

iii. $\frac{(+5) \times (-3)}{(-5)}$

09. Simplify.

$$\text{i. } \frac{(-6) \times (-2)}{(-2) \times (+2)}$$

$$\text{ii. } \frac{(-12) \times (+4)}{(+2) \times (-3)}$$

$$\text{iii. } \frac{(+8) \times (-6)}{(+3) \times (-4)}$$

$$\text{vi. } \frac{(+12) \times (+6)}{(+2) \times (-2)}$$

$$\text{v. } \frac{(+10) \times (+6)}{(+3) \times (-2)}$$

$$\text{vi. } \frac{(+24) \times (+2)}{(-3) \times (-2)}$$

$$\text{x. } \frac{(+15) \times (+6)}{(+45) \times (-2)}$$

$$\text{xi. } \frac{(+20) \times (+5)}{(+25) \times (-2)}$$

$$\text{xii. } \frac{(+50) \times (+5)}{(+5) \times (-2)}$$

10. Fill in the box

$$\frac{(-9) \times \square}{(-6)} = (+6)$$

❖ Past paper questions (Angles)



01. I. Simplify.

$$(+8) + (-3) =$$

II. Find the value using the number line.

$$(-2) - (-5) = \dots$$

III. Filling the blanks.

$$\begin{aligned} \text{a)} \quad & (+10) - (+2) \\ & = (+10) + \square \\ & = \square \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & (-8) - (-2) \\ & = (-8) + \square \\ & = \square \end{aligned}$$

$$\text{c)} \quad \frac{\square \times (+4)}{(-3) \times \square} = \frac{(-36)}{\square} = 3$$

02. a) Write the following numbers in the ascending order

$$(-10)^3, 3^3, (-1)^{10}, 2^4$$

b) Find the value $(-2)^3 + 3^2$

X. $9m - 4n + 6m + 7n$

XI. $11a + 6b - 4a - 2b$

XII. $13p - 8q + 5p - 6q$

03. The length of a rectangle is 5 meters more than its breadth.

- (i) Write an algebraic expression for the length of the rectangle by taking its breadth as b meters.
- (ii) Write an algebraic expression for the breadth of the rectangle by taking its length as l meters.

04. The age of a father is 3 times the age of his son.

- (i) Write an algebraic expression for the father's age by taking the son's age as s years.
- (ii) Write an algebraic expression for the son's age by taking the father's age as f years

05. The cost of a notebook is Rs.10 more than the cost of a pen.

- (i) Write an algebraic expression for the cost of the notebook by taking the cost of a pen as p rupees.
- (ii) Write an algebraic expression for the cost of the pen by taking the cost of the notebook as n rupees.



06. A water supplier charges Rs.200 as a fixed service charge and Rs.15 per liter of water supplied. Write an algebraic expression for the total cost of buying n liters of water



07. An internet provider offers a fixed charge of Rs.300 per month and Rs.80 per 1 GB of extra data used beyond the limit. Write an algebraic expression for the total monthly bill if x GB of extra data is used.

08. A bicycle rental shop charges Rs.200 as a base rent and Rs.20 per hour for using the bicycle. Write an algebraic expression for the total cost if a bicycle is rented for h hours



09. In a Car park, charges Rs.100 as an entry fee and Rs.40 per hour for parking. Write an algebraic expression for the total parking fee if a car is parked for t hours.

10. A mobile service provider charges Rs.5 as a base fee and Rs.2 per minute for voice calls. Write an algebraic expression for the total cost of a call that lasts m minutes.

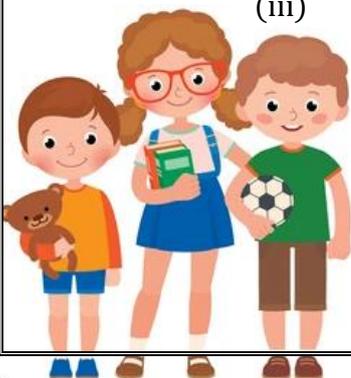
11. The work experience (in years) of three employees in a company is given by m , n , and t years respectively . Construct algebraic expressions for:

- (i) Their total work experience.
- (ii) Their total work experience after 2 years.
- (iii) The difference in work experience between the most experienced and least experienced employee.
- (iv) The sum of the experience of two employees when the third had just joined.



12. The ages of three siblings are given by s , t , and u years, respectively. Construct algebraic expressions for:

- (i) The sum of their ages.
- (ii) The age difference between the eldest and the youngest.
- (iii) The total age of all siblings after 6 years.



13. A person has m rupees in their bank account. Every month, they withdraw w rupees and deposit d rupees.

Construct an algebraic expression for the total amount in the account after 6 months.

14. A library has b books at the beginning of the year. Each month, t books are borrowed and r new books are added.

Construct an algebraic expression for the total number of books in the library after 8 months.

15. A factory has n workers at the beginning of the year. Every month, x workers leave, and y new workers are hired.

Construct an algebraic expression for the total number of workers in the factory after 4 months.

16. Fill in the blanks.

(i) $4(m + 5) = \dots\dots\dots + 20$

(ii) $7(a - 3) = 7a - \dots\dots\dots$

(iii) $9(2x + y) = 18x + \dots\dots\dots$

(iv) $5(3p - 4q + 2) = 15p - 20q + 10$

(v) $2(4x - 7y + 5) = 8x \dots\dots\dots + 10$

(vi) $10(3a - 2b + 4) = \dots\dots\dots - 20b + 40$

(vii) $6(x + y - 2z) = \dots\dots\dots + 6y \dots\dots\dots$

(viii) $8(5m \dots\dots\dots + 3) = 40m - 16n + 24$

(ix) $9(x \dots\dots + 6) = 9x - 9y + \dots\dots$

(x) $7(2p - 3q + \dots\dots) = \dots\dots - 21q + 35r$

(xi) $5(4a - \dots\dots + 7) = 20a - 10b + \dots\dots$

(xii) $\dots\dots (6x - 4y + 8) = 18x - \dots\dots + 24$

17. Simplify

i. $4(3x - 2)$

ii. $7(5y + 3)$

iii. $6(2p - 4q)$

iv. $8(3a - 5b + c)$

v. $3(x + y + 2z)$

vi. $9(2m - n + 4)$

vii. $5(a - 3b) + 2c$

viii. $4(2x - 3y) - z$

ix. $3(a + 2b - c) + 2d$

x. $-4(3p - 2q)$

xi. $-6(5x + 2y)$

xii. $-3(2m - 4n + 5)$

xiii. $-7(4a - b + 3c)$

xiv. $-2(6x - 5y + z)$

xv. $-8(p - 2q + 3r)$

18. Simplify

i. $x \times 3y$

ii. $2m \times (-5n)$

iii. $(-4p) \times q$

iv. $(-6a) \times (-b)$

v. $7x \times (-3y)$

vi. $(-8m) \times (-2n)$

vii. $5a \times (-b)$

viii. $3x \times 4y \times (-2z)$

ix. $(-9p) \times q \times (-r)$

x. $(-7a) \times (-2b) \times (-3c)$

xi. $4m \times (-5n) \times (-2p)$

xii. $(-2x) \times (-3y) \times (-4z)$

xiii. $6a \times b \times (-5c)$

xiv. $(-3x) \times (-y) \times 2z$

xv. $(-4a) \times (-5b) \times (-6c)$

19. Simplify

i. $-(x+2) - 4(x+3)$

ii. $-5(y-3) - 2(4-y)$

iii. $-(3-a) - 4(a+5)$

iv. $-z(z+4) - 3z(2-z)$

v. $b(b+5) - b(b+3)$

vi. $c(3c-2) - c(7-c)$

vii. $-(p+4) - 5(p+6)$

viii. $-2(q-5) - 3(7-q)$

ix. $-(x-3) - 2(x+5)$

x. $-m(m+4) - 3m(2-m)$

xi. $n(n+7) - n(n+4)$

xii. $-2(3a-5) - 4(a+2)$

xiii. $-p(2p-3) - p(5-p)$

xiv. $-(r-6) - 2(r+8)$

20. Expand each algebraic expression given below and find its value by substituting the given values for the unknowns.

i. $5(a + 3b) - 2(a - 2b) ; - (a = 2, b = -1)$

ii. $-4m(2n + 3) - 4(3n + m) ; - (m = 4, n = -3)$

iii. $7(2p + 3q - 2r) - 2(3p - 2q + 3r) ; - (p = 8, q = -2, r = 0)$

iv. $-2(2a + 3b - c) - 2(4a - b + c) ; - (a = 1, b = -3, c = 4)$

$$v. -3(2p + 3q + r) - 2(4p - q - r) \quad ; - \quad (p = 1, q = -2, r = 4)$$

❖ Past paper questions (Algebraic Expressions)



01. (a) Length of a rectangular land is x and the breadth of it is 3m. A fence was fixed around the land, by increasing the length by 2m.

i. Draw the sketch of the portion of land covered by the fence and mark the length and the breadth.

ii. Write an algebraic expression using brackets, for the area of land covered by the fence and simplify it.

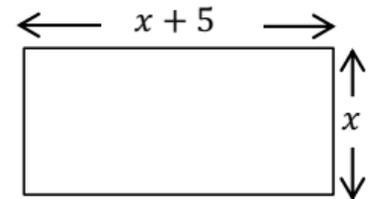
(b) Simplify. $3x + 4y + x - 3y - 5$

(c) i. Simplify $3a(2b - 1)$

ii. If $a = -1$ and $b = 2$ find the value of $3a(2b - 1)$.

02. Rectangular land with length is $x + 5$ and breath is x

i) Find algebraic expression of perimeter.



ii) Find Algebraic expression of area.

iii) If perimeter of this land is 50m. Then find the value of x and length.

03. i) Simplify.

$$2(x - 3) - x + 3$$

ii) If $x = -3$ and $y = 2$, Find the value of $x^2y + 3y^2$

iii) Simplify ; $6a + 7ab + 5ab - 3a$

iv) Join.

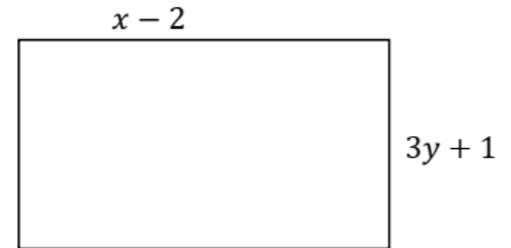
$$15x^2 + 3xy$$

$$x(x - 2y + y^2)$$

$$-4xy - 12x^2$$

$$8xy(x - 2y + 3)$$

04. i) Write an algebraic expression for the perimeter of the given rectangle

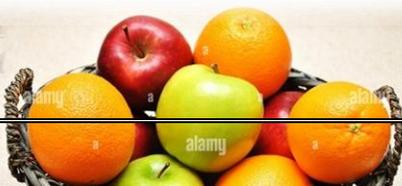


ii) A parcel was made with five apples of Rs. x each and four oranges of Rs y each.

a). Write an algebraic expression for the cost of a parcel.

b). If five such parcels were prepared, write an algebraic expression with brackets for the total cost of these five parcels.

c). Write an algebraic expression for the balance received if Rs. 1000 was given to the shop keeper to buy these items



05. (a). Simplify

i. $2(a - 3)$

ii. $-4(2a - 3b) - 5b$

iii. $5x(x + 2) - 2(x - 2)$

(b). Student bought '**p**' number of blue pens, '**q**' number of red pens and '**r**' number of blank pens from a bookshop.

i. Write an algebraic expression to represent the total number of pens he bought

ii. If one pen costs, Rs. $2p$, write the total cost in an algebraic expression.

iii.. When $p = 6$, $q = 2$, $r = 4$ find the total amount he paid

(c). If $x = -1$ and $y = +2$, Find the value of $x^2y + 3y^3$

Grade 8

Mathematics

Unit – 06

06. Solids



01. Fill in the blanks in the table given below.

Solid	Number of edges	Number of faces	Number of vertices
Cube			
Cuboid			
Regular tetrahedron			
Square pyramid			
Triangular prism			

02. Draw nets that can be used to construct the following solids

i. Cube

ii. Cuboid

iii. Square pyramid

iv. Regular tetrahedron

v. Triangular prism

03. Fill in the blanks in the table given below.

Solid	Number of edges	Number of faces	Number of vertices
Regular Octahedron			
Regular Dodecahedron			
Regular Icosahedron			

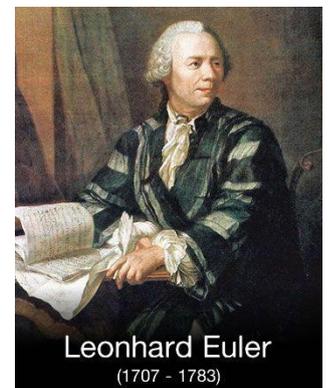
04. Draw nets that can be used to construct the following solids

i. Regular Octahedron

ii. Regular Icosahedron

05. Write the Euler's relationship

06. Which type of solids satisfy the Euler's relationship?



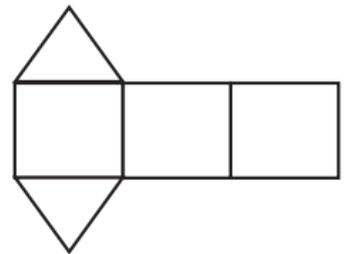
Leonhard Euler
(1707 - 1783)

07. Using the Euler's relationship, find number of vertices of a solid with 20 faces and 30 edges

08. If a certain solid has 9 edges and 6 vertices using the Euler's relationship, find the number of faces?

09. What is the name of the solid with 30 straight edges and 12 vertices?

10. i. What is the name of the solid which could be constructed using the net shown in the figure



ii. Show that solid mentioned in (i) satisfies the Euler's relationship

11. Name five platonic solids.

12. Write three Special features of the Platonic Solids.

❖ **Past paper questions (Solids)**



01. Recollect the activity that you have done regarding solids and answer the following questions.

i. What is the name of the solid which has the pentagon shaped face that you have made?

ii. Write down the Euler's relation regarding the number of edges, vertices and faces of a solid.

iii. Show that the Euler's relation is true for a regular octahedron

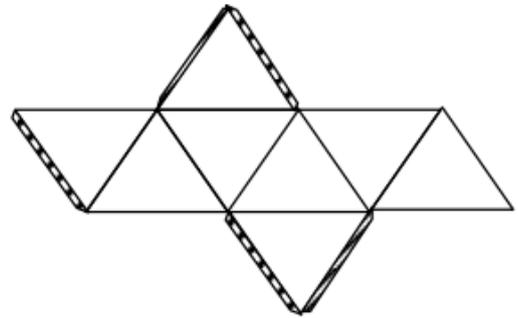
iv. Draw the shape of a face of a regular octahedron and write the name of the shape.

v. Name another two platonic solids which has the same shape of faces that you have drawn in (iv).

vi. Write down the name of a solid which does not satisfy the Euler's relation.

02. Think of the activity done in your class room when you learning the lesson of solid objects.

i) Name the solid that can be constructed using the net given above.



ii) Write the shape of its face .

iii) Using above solid find a) number of edges.

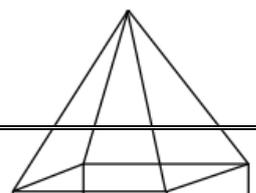
b) number of faces

c) number of vertices

iv) Write down the Euler's relationship for solids.

v) verify Euler's relationship using the information of above question.

iv) This is a solid constructed by joining a cube and a square pyramid. Find,



a) number of edges

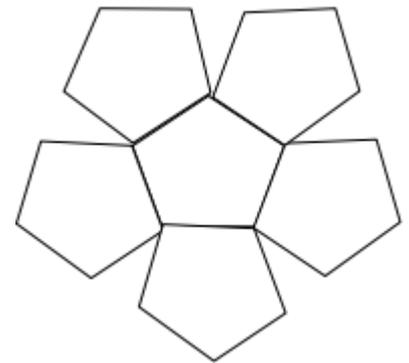
b) number of faces

c) number of vertexes

03. Recall the activity you did in your class room on “constructing the solids” and answer the following questions

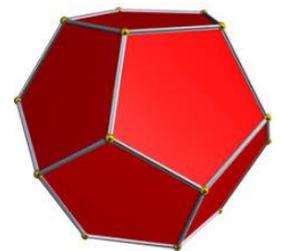
i) Name the solid that you made by using this block?

ii) How many such blocks did you use for that?



iii) Write the number of faces, edges and vertices of the above solid?

iv) Write a property of platonic solid.



v) Name two platonic solids except above solid.

vi) Write the Euler's relation

vii) Find the number of faces of a solid that has 4 vertices and 6 edges.

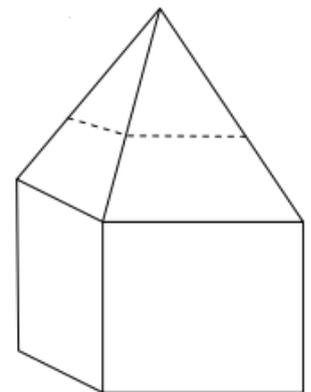
Solid	Number of faces	Number of vertices	Number of edges
a)	4	.....	.....
b) .....	.....	6	12
c)	20	.....	30

04. i) Grade 8 student made three regular solids which have only triangular faces for an assessment. Complete the table given below using those three solids.

ii) He made a another solid of which all the faces are regular pentagons. Name the solid.

iii) Below figure shows a composite solid made by combining a cube and a square based pyramid.

(a) Find the number of faces edges and vertices of this composite solid.



In the above combined solid, the upper portion of the square based pyramid was cut off along the dotted line to make a vesak lantern.

(b) Draw a rough diagram of the newly created composite solid.

(c) Find the number of faces, edges and vertices of that solid.

Grade 8

Mathematics

Unit - 07

07. Factors

$$2 \times 3 = 6$$

Factors Product

01. Find the HCF of each set of numbers given below.

i. 12, 18, 30

ii. 8, 10, 60

iii. 18, 36, 42

iv. 20, 50, 30

02. Find the HCF of the algebraic terms in each part given below

i. $8xy$, $12x^2y$, $6xy^2$

ii. $9ab$, $15a^2b$, $18ab^2$

iii. $14p, 10pq^2, 8q$

viii. $14m, 21mn^2, 9m^2n$

iv. $7x, 14xy, 21xy^2$

v. $16ab, 24ab, 40ab^2$



03. Write each of the algebraic expressions given below as a product of two factors such that one factor is the HCF of the terms of the expression.

i. $3x + 6xy + 12$

ii. $2x^2 - 3x - 12xy$

iii. $5m + 20m^2 - 40$

iv. $8m - 16mn^2 - 24mz$

v. $2x^2 - 3xy - 12x^2y$

vi. $36x^2y^2 + 12xy^2 - 6xy$

vii. $4a^2 + 12ab - 36abc$

viii. $48 - 12y^2 + 4xy$

ix. $4pq^2 - 16pq - 24$

x. $2a - 3ab - 6b^2$

xi. $5xy - 15xy^2 - 30x$

xii. $10p - 20pq - 30q^2$

xiii. $-5x^2 - 10y - 15xyz$

ivx. $-6x - 12y^2 + 24xy$

04. Write each of the algebraic expressions given below as a product of two factors such that one factor is a negative number.

i. $-3x^2 - 6xy + 9xy^2$

ii. $-7ab - 14a^2 + 21 a^2 b$

iii. $-8p^2q - 16pq + 24q^2$

iv. $-4m + 12mn - 20n^2m$

v. $-6x - 9xy^2 + 12xy^2$

vi. $-2a^2b - 5ab - 7 a^2b^2$

vii. $10x^2y - 20xy + 30y$

viii. $-3pq^2 + 6pq - 9q^2$

ix. $-15m^2 - 30mn + 45n^2$

x. $-8x + 16xy - 24x^2y^2$

04. Match each algebraic expression in Group A with its equivalent expression in Group B.

Group A**Group B**

(i) $3(2x + 4y - 4)$

A. $10a - 5b + 15c$

(ii) $5(2a - b + 3c)$

B. $6x + 12y - 12$

(iii) $4m(2n + 3p - 5)$

C. $-14pq + 7pr - 7p$

(iv) $6(x - y + 2z)$

D. $-5xy + 15xz - 10x$

(v) $-2a(3b - 4 + c)$

E. $2ab + 6ac - 8ad$

(vi) $-7p(2q - r + 1)$

F. $6x - 6y + 12z$

(vii) $3x(5 - 2y + z)$

G. $-8pq + 28p - 8pr$

(viii) $-4r(3s - 2t + u)$

H. $8mn + 6mp - 12m$

(ix) $2m(4n + 3p - 6)$

I. $15x - 6xy + 3xz$

(x) $-5x (y - 3z + 2)$

J. $-6ab + 8a - 2ac$

(xi) $2a (b + 3c - 4d)$

K. $-12rs + 8rt - 4ur$

(xii) $-4p (q - 7 + 2r)$

L. $8mn + 12mp - 20m$



❖ Past paper questions (Factors)

01. a) Simplify

i) $4m (n + 2) - 2 (n - 3 m)$

ii) $2a (a + 3) + a^2 - 2a + 5$

b) i) Find the H.C.F of $4a^2b, 20ab, 28ab^2$

ii) Factorize $-5mn - 15m^2 - 10m$

02. I. Find the H.C.F of the following numbers.

$$8xy, 40x, 32xb$$

II. Write down following algebraic expression as a product of factors, $-15a + 20b - 30$

a) Where one factor is a positive number.

b) Where one factor is a negative number.

III. Simplify. $4x(7 - 5xy + y^2)$

IV. Filling the blank. $(-28) = \dots\dots X \dots\dots$

03. i. Find the highest common factor.

$4ax, 6abx$

ii. By taking the highest common factor as a one factor, write as a product of two factors.

$24ax + 16a^2b + 8a$

iii.. Write as a product of two factors $-5x - 20y$

iv. Fill in the blanks

$-6a + 8ab = -2a (\quad)$

04. i) a) Express 36 as a product of prime factors.

b) Find the highest common factor of 18, 24 and 30.

c) Find the highest common factor of $6xy$, $12x^2y$, $18x^2y^2$.

d) Express the following algebraic expressions as a product of two factors.

i) $6ab + 9ac - 15$

ii) $15pq + 45qr + 60q$

Grade 8

Mathematics

Unit - 08

08. Square Root



Number	Square of the number	Value
1	$1 \times 1 = 1^2$	1
.....	$2 \times 2 = 2^2$	.....
3	$3 \times 3 = \dots\dots\dots$	9
4	$4 \times 4 = 4^2$	.....
5	$5 \times 5 = \dots\dots\dots$	25
6	.....	36
7	$7 \times 7 = 7^2$	.....
8	.....	64
9	$9 \times 9 = 9^2$	.....
10	.....	100
11	$11 \times 11 = 11^2$	.....
12	$12 \times 12 = 12^2$	.....

13	.....	.....
14	.....	196
15	$15 \times 15 = 15^2$	.....
16	.....	.....
17	$17 \times 17 = 17^2$	.....
18	.....	324
19	.....	.....
20	.....	.....

01. Complete the table given below

02. Complete the table given below

Odd numbers added consecutively	Sum	The perfect square in index form
1	1	1
1 + 3	.....	2^2
.....	9	.....
1 + 3 + 5 + 7	.....	4^2
.....	25	5^2
.....
1 + 3 + 5 + 7 + 9 + 11 + 13	.....	.....
.....	64	.....
.....	81	.....
.....	.....	10^2

03. By considering the digit in the units place of each of the numbers given below, show that they are not perfect squares.

i. 622

ii. 453

iii. 407

iv. 8337



v. 2043

vi. 5082

04. Find the value of each of the following.

i. $\sqrt{2 \times 2 \times 2 \times 3 \times 3 \times 3}$

ii. $\sqrt{4 \times 4 \times 2 \times 2 \times 3 \times 3}$

iii. $\sqrt{(2 \times 5)^2}$

iv. $\sqrt{(3 \times 2)^2}$

v. $\sqrt{(3 \times 5) \times (3 \times 5)}$

vi. $\sqrt{(2 \times 4) \times (2 \times 4)}$

vii. $\sqrt{(2 \times 5 \times 3)^2}$

viii. $\sqrt{(3 \times 2 \times 4)^2}$

05. Find the square root using prime factors

i. 196

ii. 576

06. Find the square root of each of the numbers given below by observation

i. 169

ii. 289

iii. 529

iv. 841

v. 361

vi. 484

vii. 676

viii. 729

07. Find the value $\sqrt{\frac{100}{9}}$



❖ Past paper questions (Square root)

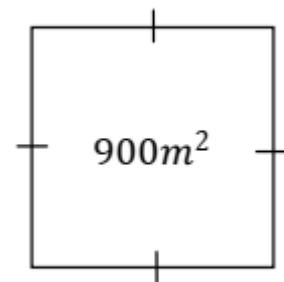


01. i. (a) Find the value of $\sqrt{144}$

(b) Simplify $\sqrt{(2 \times 5)^2 \times 7^2}$

(c) Find the value of $\sqrt{576}$ using prime factors.

iii) The area of a square shaped land is $900m^2$.



(a) Find the length of one side

(b) Find perimeter of the land.



- (c) It is intended to put five rounds of barbed wire around this land. Find out the cost of this if 1m of wire is Rs. 10.

Grade 8

Mathematics

Unit - 09

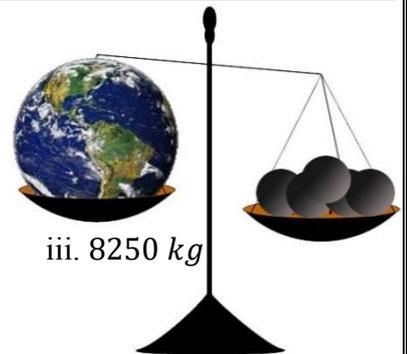
09. Mass

01. Express the masses given below in metric tons.

i. 5000 kg

ii. 4500 kg

iii. 8250 kg



iv. 1 t 200 kg

v. 5 t 80 kg

vi. 17 t 900 kg

vii. 10 t 70 kg

viii. 1 t 5 kg

ix. 20 t 101 kg

02. Express each mass given below in kilograms.

i. 4 t

ii. 3.154 t

iii. 3.5 t

iv. 1 t 300 kg

v. 20 t 25 kg

vi. 10 t 800 kg

vii. 10 t 170 kg

viii. 1 t 5 kg

ix. 20 t 10 kg

03. Express each mass given below in metric tons and kilograms.

i. 3.5 t

ii. 8.575 t

iii. 10.2 t

iv. 15.5 t

v. 20.25 t

vi. 10.5 t

vii. 10.003 t

viii. 1.23 t

ix. 20.08 t



04. Simplify the following

$$\begin{array}{r} \text{i.} \quad t \quad kg \\ 14 \quad 25 \\ + 15 \quad 15 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{ii.} \quad t \quad kg \\ 20 \quad 720 \\ + 12 \quad 810 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{iii.} \quad t \quad kg \\ 28 \quad 920 \\ + 10 \quad 100 \\ \hline \\ \hline \end{array}$$

05. The mass of a suitcase is 15.5 kg, and the mass of a backpack is 7.2 kg.

(i) What is the total mass of the suitcase and backpack in kilograms?

(ii) Express the total mass in grams.



06. The mass of a car is 1.2 metric tons.

(i) Express the mass of the car in kilograms.



(ii) If the car is carrying 4 passengers with an average mass of 70 kg each, what is the total mass of the car and passengers in metric tons?

07. A shipping container has a mass of 2.5 metric tons. It is loaded with 50 identical crates, each with a mass of 40 kg.

(i) What is the total mass of the crates in metric tons?



(ii) What is the total mass of the shipping container with the crates, in metric tons?

08. Simplify the following

$$\begin{array}{r} \text{i.} \quad t \quad kg \\ 20 \quad 25 \\ - 15 \quad 15 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{ii.} \quad t \quad kg \\ 50 \quad 650 \\ - 12 \quad 800 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{iii.} \quad t \quad kg \\ 38 \quad 700 \\ - 10 \quad 900 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{iv.} \quad t \quad kg \\ 5 \quad 4 \\ - 1 \quad 15 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{ii.} \quad t \quad kg \\ 10 \quad 53 \\ - 2 \quad 800 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{iii.} \quad t \quad kg \\ 20 \quad 3 \\ - \quad 900 \\ \hline \\ \hline \end{array}$$

09. A truck has a total mass of 4.5 metric tons. After unloading 1,200 kg of goods, what is the remaining mass of the truck in metric tons?



10. A shipment of goods has a total mass of 3 metric tons and 800 kg. If 1,500 kg of goods are removed, what is the remaining mass in kilograms?

11. A warehouse stores 5 metric tons of grain. If 1,750 kg of grain are sold, what is the remaining mass of the grain in metric tons?



12. A vehicle weighs 2.8 metric tons. After removing 900 kg of equipment, what is the new mass of the vehicle in metric tons?

13. A cargo container weighs 6.2 metric tons. If 2,300 kg of cargo are taken out, what is the new mass of the container in metric tons?

14. Simplify the following

$$\begin{array}{r} \text{i.} \quad t \quad kg \\ 22 \quad 20 \\ \times \quad \quad 5 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{ii.} \quad t \quad kg \\ 30 \quad 550 \\ \times \quad \quad 4 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{iii.} \quad t \quad kg \\ 25 \quad 650 \\ \times \quad \quad 3 \\ \hline \\ \hline \end{array}$$

15. Simplify the following

(i) $14 \text{ t } 250 \text{ kg} \times 10$

(ii) $3 \text{ t } 500 \text{ kg} \times 15$

(iii) $10 \text{ t } 300 \text{ kg} \times 18$

(iv) $6 \text{ t } 450 \text{ kg} \times 22$

(v) $30.05 \text{ t} \times 16$

(vi) $4.058 \text{ t} \times 45$



(vii) $11.350 \text{ kg} \times 24$

(viii) $20.54 \text{ t} \times 10$

❖ Past paper questions (Perimeter)

01. Simplify the following.

i. $15 \text{ t } 250 \text{ kg} \div 3$

ii. $5 \text{ t } 975 \text{ kg} \div 5$

iii. $25 \text{ t } 900 \text{ kg} \div 5$

iv. $35 \text{ t } 980 \text{ kg} \div 3$

v. $18 \text{ t } 51 \text{ kg} \div 3$

ii. $12 \text{ t } 75 \text{ kg} \div 5$

iii. $25 \text{ t } 900 \text{ kg} \div 12$

iv. $45.990 \text{ t} \div 6$

03. Write down each of the following numbers as a product of powers of which the bases are prime numbers

i. 144

ii. 400

iii. 580

iv. 720



04. Write 256 in index notation

(i) with base 2

(ii) with base 4

(iii) with base 8.

05. Express each of the following powers of products as a product of powers of the factors of the given product.

i. $(2 \times 4)^2$

ii. $(5 \times a)^3$

iii. $(x \times y)^4$

iv. $(4a)^2$

v. $(2b)^3$

vi. $(3y)^4$

06. Express each of the following products of powers as a power of a product

i. $2^2 \times 3^2$

ii. $3^3 \times 4^3$

iii. $x^3 \times y^3$

iv. $2^2 \times a^2 b^2$

v. $3^3 \times y^3 z^3$

vi. $2^3 a^3 b^3$

vii. $(2a)^2 \times b^2$

viii. $(3a)^3 \times y^3$

ix. $(4y)^2 \times a^2$

07. Find the value

i. $(-1)^4$

ii. $(-2)^3$

iii. $(-4)^0$

iv. $(-3)^4$

v. $(-5)^3$

vi. $(-6)^2$

❖ Past paper questions (Perimeter)



01.

i. Express $8a^3$ as a power of product.ii. Write $(9ab)^2$ as a product of powers and simplify itiii. Simplify
 $(3p)^3 \times (2q)^3$

iv. If $a^3 = 8 \times 27$, find the value of a

v. Find the value of $(-1)^{2017} + (-1)^{2018} + 2$

02. a). i) Write 180 as a product of prime numbers and represent it as an index form.
ii) Write $9x^2$ as a power of a product.

iii) Find the value of $[(-1)^3 \times 3^2] + (2^2 \times 5^2)$.

b). i) Write the following numbers in the ascending order.

$(-10)^3, 3^3, (-1)^{10}, 2^4$

ii) Find the value $(-2)^3 + 3^2$

03. Express as a power of a product. $a^3 \times (2b)^3 \times c^3$

04. i. Represent $81P^2$ as a power product.

ii. if $x = -1$ and $y = +2$, Find the value of $x^4 + y^3$