**BACKGROUND OF THE AUTHOR**

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**THE MATHEMATICS**

**EXPERTS CONSULT BOOK UPPER PRIMARY**

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**TOPIC: INTEGERS:**

**APPLICATION OF INTEGERS PART ONE (AGES)**

1. A man was born in 20 BC and died in 45 AD. How old was the man by the time he died?

Age= Death Year-Birth year AD for (+)

+45 - (-20) BC for (-)

+45+20 (-) × (-) = (+)

= +65

**He was 65 years old by the time he died.**

2. Mr.Lizard was born in 23 BC and died at the age of 53 years. In which year did he die?

Death year = Birth year + Age

-23 + (+53) AD for (+)

-23+53 BC for (-)

= +30 (+) × (+) = (+)

**He was born in 30AD**

**1.** Roy was born in 15 BC. He was elected as the area member of parliament in 35AD. At what age was he elected as the area member of parliament?

**2.** A woman was born in 13 BC and died in 74 AD. How old was she when she died?

3. Betty was born in 15 BC and died at the age of 67 years. In which year was she born?

4. Dribareo who was 53 years was born in 41 BC. In which year did she die?

5. Let's take it that you were born in 2006 and we are in 2024, how old are you?

6. Assuming that you are 26 years old in 2018. Find your birth year using the knowledge of integers you have learnt.

**APPLICATION OF INTEGERS PART TWO (TEMPERATURE)**

1. The temperature of Tororo was +350C. It rose by +30C. What is the new temperature?

The word **Rose** meanspositive (+)

New temperature = Initial temperature + Temperature Rise

+350c + +30c

+350c + (+30c)

+350c + 30c

= +380c

**The new temperature is +380c**

2. The temperature of the place was +50c in the morning. It declined by +30c. What is the new temperature now?

New temperature = Initial temperature – Decline in temperature

+50c - +30c

+50c – (+30c)

+50c – 30c

= +20c

**The new temperature is +20c**

3. Patrick bought water from a fridge at -150c. He waited when the water was at +50c and drank it. What was the difference in the temperature of the water by the time he drank it?

Temperature difference = Final temperature – Initial temperature

+50c - -150c

+50c – (-150c)

+50c + 150c

= +200c

**The difference in water temperature was +200c**

**Activity**

1. The temperature of the place was -150c in the morning. It rose to +120c by noon. Find the rise in temperature in 0C

2. The temperature of Kampala town was 130c. After it rained, the temperature dropped by 40c. Find the new temperature of Kampala.

3. The temperature of a place reduced from -340c to -550c. Find the decrease in the temperature.

4. The temperature of Nagongera town council increased from -50c to +150c. Find the temperature rise.

5. Oketcho Patrick Roy moved 6 steps forward, then 3 steps backward, and 2 more steps forward.How many steps did he move forward?

6. A frog fell into a pit that was 30m deep. Each day, it climbs 3m but falls back 2m at night. How many days will it take to come out of the pit?

**APPLICATION OF INTEGERS PART THREE:**

1. A teacher awards 3 marks for every correct answer and deducts 2 marks for every wrong answer given in a test of 30 questions.

a) If a boy answers 25 questions correctly, what is his final scores?

Correct answers + wrong answers = Final marks

Correct answers Wrong answers

= 25 (30-25) = 5

(25 × +3) + ( 5 × -2)

+75 + -10

+75 – 10

**= 65 marks**

b) If A girl fails 12 questions, find her final score.

Correct answers + Wrong answers = Final Marks

Wrong answers Correct answers

= 12 (30-12) = 18

Correct answers + Wrong answers = Final Marks

(18 × +3) + (12 × -2)

54 + (-12)

(54 – 12) **= 42 marks**

2. In an interview, 5 marks are awarded for any correct response and 2 marks are subtracted for any wrong response given. If the panel had 20 questions to answer.

a) What was the score of a candidate who failed 3 questions?

Correct answers + Wrong answers = Final score/marks

Correct responses Wrong responses

(20 – 3) = 17 = 3

Correct answers + Wrong answers = Final Marks

(17 × +5) + (3 × -2)

85 + (-6)

85 – 6

**= 79 marks**

b) If a candidate passed 16 questions, what was his final score?

Correct responses + Wrong responses = Final marks

Correct responses Wrong responses

= 16 (20-16) = 4

(16 × +5) + (4 × -2)

80 + (-8)

80-8

**= 72 Marks**

c) How many questions were passed by the candidate who scored 51 marks?

Let the number of correct /passed questions be represented by letter **K**

Correct questions = K Wrong questions = (20-K)

Correct answers + Wrong answers = Final score

(k × +5) + -2(20-k) = 51

5k + (-40) + 2k = 51

5k – 40 + 2k = 51

7K – 40 + 40 = 51 + 40

7k = 91

=

**K = 13**

**The candidate passed 13 questions**

3. How many wrong responses/questions were given by a candidate who scored 65 marks?

Let the number of wrong responses be represented by letter m.

Wrong responses = m Correct responses = (20-m)

Correct response + Wrong response = Final score

+5(20 – m) + (-2 × m) = 65

100 – 5m + -2m = 65

100 – 5m – 2m = 65

100 – 7m = 65

100 – 100 – 7m = 65 – 100

**-**7m = **-**35

=

**m = 5**

**The candidate gave 5 wrong responses**

**Activity:**

1. When marking a test, a teacher awarded 3 marks for every correct response and subtracted a mark for every wrong response in a test of 20 questions.

a) Find the score of a candidate who failed 7 questions.

b) What will be the score of a candidate who passes 17 questions?

c) Find the number of correct responses got by a candidate who scores 44 marks .

d) How many wrong responses were given by a candidate who scored 16 marks?

2. A teacher awarded 5 marks for every correct answer and subtracted 2 marks for wrong answer given in a quiz of 20 questions.

a) How many marks were scored by a candidate who;

(i) Passed 11 questions? (ii) Failed 2 questions?

(iii) Passed 13 questions? (iv) Passed 18 questions?

b) Find the number of wrong answers which were given by a candidate who scored 72 marks.

c) Assuming you were part of the candidates who took up that quiz and it so happened that you got 86 marks, how many correct and wrong answers would you have given?

3 (a) The Deserter has a total of 30 hens and sheep in his farm. How many animals of each kind are in the farm if they have 82 legs in total?

b). From the total of 82 legs on all the 30 animals in the farm, determine the total number of legs each hens and sheep have respectively.

4. In Joy and Roy’s farm, there are a total of 12 turkeys and cows. If they have 32 legs altogether;

a) How many turkeys are in the farm?

b) Find the number of cows at Roy and Joy’s farm.

**TOPIC: ALGEBRA**

Algebra is a part of mathematics in which letters and other general symbols are used to represent numbers and quantities in formulae and equations **or** Algebra is the type of mathematics that uses letters to represent numbers.

In algebra, we often use symbols to translate word phrases into algebraic expressions/mathematical expressions.

**Note that:**

A mathematical expression is made up of a co-efficient, a variable, an operator and a constant as shown below ↓↓

**3K + 4 = 24**

Where **3 →** The co-efficient

**K** → A variable

**+ →** An operator

**4** and **24** → Constants

* A co-efficient is a numerical value that appears alongside a variable or a term in an equation or an expression.
* A variable is any letter used to represent an unknown quantity/number in an expression or equation.
* An operator is a mathematical symbol used in either an expression or equation. These symbols are **+** ,  **-**  , **x** and **÷**
* A constant is a fixed value that doesn’t change. A constant has a known value.

**WORD PHRASES USED FOR EACH OF THE FOUR OPERATIONS IN ALGEBRA:**

**Addition (+)** **2. Subtraction (-)**

Total -Minus

Altogether -Subtract

Increased by -Take away

Add - Difference

Plus - Decreased by

More than -Less than

Older than -Deduct

Sum -Range

**3. Multiplication (x) 4. Division (÷)**

* Multiply -Divide
* Product -Share
* Square of -Distribute
* Times -Quotient
* Of
* Thrice
* Cube of
* Twice

**Mathematical phrases for the above four operations:**

**1.** Sum of y and 4

(Y + 4)

2. 5 more than k

= (K + 5)

3. 8 less than p

= (P – 8)

4. Divide r by 6 and add 5 to its results.

 + 5

6. Square of x

= X2

7. Square the product of y and 9

(y x 9)2

= 9y2

8. Add p and q

(P + q) or (q + p)

9. Add 4 to  of a number

Let the number be n.

[  of n] + 4

[  x n] + 4

=  n +4

10. Subtract 5 from the product of p and 8.

(p x 8) – 5

= 8p – 5

**General Activity:**

1. Square the sum of a and 8

2. Add 3 to a number and triple the results.

3. Subtract 8 from x and double the results.

4. Add 5 to p and multiply the results by 7.

5. The product of x and y

6. Add 9 to q.

7. Subtract h from 2.

8. Multiply a by 4.

The quotient of p and q.

9.Add 5 to m and then multiply the result by 7.

10. Multiply 14 by r and then subtract 3 from the result.

11. A quarter the sum of x and 4.

12. Subtract k from 16.

13.The sum of twice of x and thrice y.

14. Multiply the difference between b and 6 by 8.

**Meaning of the algebraic expressions:**

1. a + b → (a) + (b)

2. ab → (a) x (b)

3. ab + ac → (a x b) + (a x c)

4. a(b-c) → a x (b-c)

5. 7k2 → 7 × k2  or 7 × k × k

6. py2 → p × y × y

7. x – y → (x) – (y)

8. y4 → y × y × y

9. Square root of k → √k

**SUBSTITUTION:**

The word Substitution simply means to **replace.**

**Examples;**

1.Given that a = 2, b = 3 and c=4.

Find the value of a + b + c.

a + b + c

2 + 3 + 4

= 7

2. If x = 4 and y = 7. Find the value of:

(i) 3x + 4y

(3 × x) + (4 × y)

(3 x4) + (4 x 4)

12 + 16

**= 28**

(ii) 3y -2x

(3×y) + (2 × x)

(3 ×7) + (2 × 4)

21 + 8

**= 29**

**General activity;**

1. Given p =3, q = 5 and r = 2. Find the value of
2. pq + 2r (ii) pq + r (iii) p + q + r
3. If a = 5, b = 4 and c = 0. Find the value of
4. abc (ii) bc - a (iii) a2 + bc
5. Given that x = 2 and y = -3. Find the value of
6. y + x (ii) y4  + 2x (iii) x2 +4y
7. If m = 5, n = m and p = -2. Find the value of
8. mnp (ii) (iii)
9. Given that m = 5, n = 6 and p = 3m. Work out the value of
10. 2m + p2 (ii) mp + n (iii) np2
11. Given that a = 3, b = 7. Find the value of
12. 2a + 2b (ii) 2b - 3a (iii) a + b (iv) ab

If x = 4, y = -2 and z = 3. Find the value of

1. x + z (ii) xyz (iii)
2. Given that n = 4 and t = 3. Find the value of
3. Given that x = and y = . Find the value of x + y

**COLLECTING AND SIMPLIFYING ALGEBRAIC TERM**

**TO BE CONTINUED………………………………………………….**

**APPLICATION OF ALGEBRA USING RATIOS:**

**PART ONE:**

1.Joyce is 12 years older than Alice. If the ratio of their age is 5:8 respectively. Find their age.

Let the age of Alice be represented by letter m

|  |  |  |
| --- | --- | --- |
| Alice | Joyce | Ratio |
| m | M+12 | 5:8 |

m:(m+12) = 5:8

=

8×m = 5(m+12)

8m = 5m+60

8m-5m = 60

3m = 60

=

**m = 20**

**Alice = 20 years**  **Joyce = 32 years**

2. Samuel is 18 years younger than John and the ratio of their age is 2:3 respectively. How old is each now?

Let the age of John be represented by letter y

|  |  |  |
| --- | --- | --- |
| John | Samuel | Ratio |
| y | y-18 | 3:2 |

y: (y-18) = 3:2

=

(2 × y) = 3(y-18)

2y = 3y-54

2y-3y = -54

-y = -54

=

**y = 54**

John Samuel

= 54 years (54-18) = 36 years

**ACTIVITY:**

1.Cheboy is 12 years younger than Mary. If their age is in the ratio of 4:3 respectively, how old is each?

2.Owino is 6 years older than Okumu. The ratio of their age is 3:4 respectively.

a) How old is Okumu?

b) How old will Owino be in 7 years’ time?

3. Tom is 8 years younger than Andrew. How is old each one of them given that their age is in the ratio of 3:5 respectively?

4. A mother is 24 years older than her son. If the ratio of their age is 5:2 respectively, how was each 6 years ago?

5. Ogot is 10 years older Opot. If the ratio of their age is 3:2.

a) How old is Opot?

b) How old was Ogot 12 years ago?

**APPLICATION OF ALGEBRA USING RATIOS:**

**PART TWO:**

1.Tom is 8 older than Kamya. Four years ago, the ratio of their age was 4:3 respectively. How old is Kamya now?

Let the age of Kamya be represented by letter k

|  |  |  |
| --- | --- | --- |
|  | Kamya | Tom |
| Now | k | k+8 |
| 4years ago | k-4 | k+8-4 |
| Ratio | 3 | 4 |

(k-4) : (k+8-4) = 3:4

=

4(k-4) = 3(k+4)

4k-16 = 3k+12

4k-3k = 12+16

**k = 28**

**Kamya is 28 years old**

2. The age of Musa and that of Angella are in the ratio of 7:9 respectively. Five years ago, their total age was 54 years.

Find Musa’s age now.

Let the common term be represented by letter X

|  |  |  |  |
| --- | --- | --- | --- |
|  | Musa | Angella | Total age |
| Now | 7x | 9x |  |
| 5 Years ago | 7x-5 | 9x-5 | 54 |

(7x-5) + (9x-5) = 54

7x-5 + 9x-5 = 54

7x+9x -10 = 54

16x - 10 = 54

16x-10+10 = 54+10

16x = 64

=

**x = 4**

**Musa is 28 years**

**ACTIVITY:**

1. Alice is 12 years older than Joan. Eight years ago, the ratio of their age was 10:7 respectively.

a) How old is Joan now? b) How old will Alice be in 2 year's time?

2. Jan Van is 3 years older than Benjamin. In five years’ time, the ratio of their age will 4:5 respectively. How old is Benjamin?

3. Nikki is 4 years younger than Mary. In six years’ times, the ratio of their age will be 9:7 respectively. How old is Nikki?

4. The heights of two boys are in the ratio of 2:3. If the height of the shorter boy is 108cm. What is the difference in the heights of the two boys?

5. Walter and Washington shared some money in the ratio of 5:8. Walter got sh.12,000 less than Washington. How much money did Washington get?

**SOLVING SIMPLE WORD PROBLEMS INVOLVED IN ALGEBRA**

**(PART ONE)**

1.Kiplagat had some mangoes and his brother added him more 5 mangoes. If he got 12 mangoes in total, how many mangoes did have at first?

2.Think of a number, multiply it by 3 and the answer is 12.What is the number?

3. What number is divided by 3 to give 5?

4. Think of a number, subtract 5 from it and the answer is 2.

What is the number?

5. James thought of a number, multiplied it by andtheproductwas20. What was the number?

6.What number is divided by 2 and it gives 7 as the remainder?

7. Find the number which Roy added to 12 to get 25.

8.The sum of a number and 7 is 12. What is the number?

9. The product of x and 7 is 21. Find x

10. Ogot has 7 more goats than Joy. Altogether they have 47 cows. How many cows does each one have?

11. A boy is 5 years older than his sister. Their total age is 19 years. Find their ages.

12. Oscar got 6 more books than his brother Mike. Altogether they got 24 books. How many books did Mike get?

13. Reagan is 8 younger than Roy. Their total age is 30 years.

How old is Roy?

**FORMING AND SOLVING EQUATIONS:**

**(PART ONE)**

1.Peter is 5 yearsolder than his sister Apio. Their total is 27 years

a) How old is each now?

b) How old will Peter be in 7 years’ time?

2. A daughter is 18 years younger than her mother. Their total age is 58 years, how old is the mother now?

b) How old will the daughter be in 10 years to come?

3. A father is 12 years older than his son now. In 5 years’ time, their total age will be 76 years.

a) How old is each of them now?

b) How old will the father be then?

4. A mother is 18 years older than her son. If their total age is 52 years, how old is the son now?

5. The Deserter is 5 years older than The Infantry. In 7 years’ time, their total age will be 33 years.

a) How old is the Infantry now?

b) How old will the Infantry be then?

6. John is 4 years older than Mary. In 20 years’ time, their total age will be be 80 years. How old is John?

b) How old will John be in 20 years’ time?

7. Cynthia is twice as old as Joseph. Their total age is 24 years.

a) How old is John?

b) How old will Cynthia be in 21 years to come?

8. A mother is three times as old as her daughter. In 7 years’ time, their total age will be 74 years.

a) How old is each now?

b) Find the difference in their age in seven years’ time.

9. Jane is twice as old as Sarah. If their total age is 30 years, how old is Sarah?

10. If Tony is thrice as old as Annet. If their total age is 44 years. How old is Annet?

**FORMING AND SOLVING EQUATIONS INVOLVING BRACKETS:**

**(PART TWO)**

1. Akello is 3 times as old as Awino. The difference in their age is 30 years. How old is each of them now?

2. Ben is 11 years older than Isaac. In 4 years’ time, Ben will be twice as old as Isaac.

a). How old is Isaac? b) Find the difference in their ages.

3. Michael is 10 years younger than Innocent. In 5 years’ time, Innocent will be twice as old as Michael.

How old is Michael?

4. Tr. Margret is 15 years old than Tr. Samuel. In 4 years’ time, Tr.Margret will be twice as old as Tr. Samuel.

a). How old is Tr. Margret now? b) How old will Tr.Simon be then

5. Barbara is 5 times as old her son. In 6 years’ time, she will be three times as old her son. How old is each of them now?

6. Mwanga is 5 years old and Kintu is 7 years old. In how many years ago was Kintu twice as old as Mwanga?

b). How old was Kintu then?

7. Andrew is 37 years old. Margret is 14 years old. After how many years will Andrew be twice as old as Margret?

8. A man is four times as old his son. If their total age is 50 years, how old is the son?

9. A mother is 5 times as old as the son. In 5 years, the difference in their age will be 32 years. How old is each of them now?

10. Emmanuel is thrice as old as his son. The difference between their ages is 24. How old is the son now?

11. John is 19 years old, Sarah is 6 years old. At what age will John be twice as old Sarah?

12. Mary is thrice as old Justine. Five years ago, their total age was 30 years. How old will Mary be 8 years from now?

13. A son is 30 years younger than his mother. In 20 years the mother will be twice as old as the son. How old is the son now?

14. A father is 20 years older than his son. In 5 years’ time, the father will be twice as old as old as the son. How old will the son be then?

15. Shadrack is 5 times as old as Jimmy. The difference between their age is 36 years. How old is Shadrack?

16. Alex is 25 years old. Joshua is 4 years old. In how many years will Alex be twice as old as Joshua?

17. Mr. Lizard is 15 years older than his daughter. In 10 years from now, Mr. Lizard will be twice as old as his daughter. How old is the daughter now?

18. Joseph is 20 years younger than Jacob. In 10 years’ time, Jacob will be twice as old as Joseph. How old will Jacob be then?

**GENERAL APPLICATION OF ALGEBRA IN REAL LIFE**

**SITUATION:**

1. Rose had 5 books more than Angella. Rose and Angella had 27 books altogether. Find the number of book each had.

Let Angella’s books be represented by letter m

|  |  |  |
| --- | --- | --- |
| Angella | Rose | Total |
| m | m+5 | 27 |

m+m+5 = 27

2m+5 = 27

2m+5-5 = 27-5

2m = 22

=

**m = 11**

**Rose** **Angella**

(m+5) books (m) books

(11+5) = 11 books

= 16 books

2. A teacher distributed sh.10,000 among his three children P, Q and R such that Q got twice as much as P and R got sh.1,000 more than Q.How much did each get?

Let P’s share be represented by letter k

|  |  |  |  |
| --- | --- | --- | --- |
| **P** | **Q** | **R** | **Total Share** |
| k | 2k | 2k+ sh.1,000 | sh.10,000 |

K + 2k + 2k + sh.1000 = sh.10,000

5k + sh.1000 = sh.10,000

5k + sh.1000 - sh.1000 = sh.10,000 - sh.1000

5k = sh.9000

=

**K = sh.1,800**

|  |  |  |
| --- | --- | --- |
| **P**  Sh.1,800 | **Q**  Sh.1,800×2  = sh. 3,600 | **R**  Sh.3,600 + sh.1,000  =sh.4,600 |

b). In what ratio did they share the money?

**P** : **Q** :  **R**

: :

: :

= 9 : 18 : 23

b). How much more money did child R get than p?

Sh.4,600 - sh.1,800

= sh.2,800

**Child R got sh.2,800 more than P**

3.Owere bought y pancakes and Patrick bought pancakes less than Owere. Reagan bought half as many pancakes as Patrick and Owere bought. If they altogether bought 63 pancakes, how many pancakes did each buy?

Let Owere’s number of pancakes be represented by letter y

|  |  |  |  |
| --- | --- | --- | --- |
| Owere | Patrick | Reagan | Total |
| y | (y-6) |  | 63 |

y + y - 6 + = 63

(2y – 6) + = 63

2(2y-6) + 2× = 63 ×2

2(2y-6) + 2y-6 = 63 ×2

4y - 12 + 2y - 6 = 126

4y – 12 + 2y – 6 = 126

4y + 2y – 12 – 6 = 126

6y -18 = 126

6y – 18 + 18 = 126 + 18

6y = 144

=

**y = 24**

**Owere Patrick** **Reagan**

(y) (y-6)

**=24 pancake**s (24-6)

**=18pancakes**

**= 21 pancakes**

**GENERAL ACTIVITY:**

1. Omollo had **m** oranges while Stephen had 5 times as many oranges as Omollo. They decided to put them together divided into three equal heaps. If each heap had ten oranges, how many such oranges did each have to begin with?

2. A cup costs twice as much as a plate, a spoon costs sh.400 more than a cup, a fork costs sh.200 less than a plate. If the total cost of all the items is sh.6,200. Find the cost of 3 spoons.

3. King Kong had 4y sweets which was twice as many as Ogot’s. Patricia had four sweets more than Owino while Rose had half as many sweets as Patricia. If they had 30 sweets altogether, how many did each have?

4. Agatha had sh.30,000 less than Brenda and Mary had twice as much as Agatha. If they had sh.240,000 altogether, how much did each have?

5. In a village the number of men is half the number of women. The number of children is one third the number of women. Altogether there are 52,800 people in the village. How many more women than men and children are in the village?

6. In a meeting, there were twice as many men as women. The number of children was half the number of adults. If there were 90 women in the meeting, how many more men than children were there?

7. Roy bought some pens and Joy bought 10 more pens than Roy. Ruth bought twice as many pens as Joy. If they bought 110 pens altogether, how many pens each buy?

8. In a conference, there were 500 men and 200 more women than men. If the number of adults was four times the number of children, what was the total number of people who attended the conference?

9. In Mr. Lizard’s farm, there are 5 more cows than bulls. There are four times as many goats as bulls. If there are **y** cows and the total number of animals in the farm is 53. Find the number of cows, bulls and goats on the farm.

10. Mwanja had 4p pineapples which was twice as much as Isabirye’s. Lucy had four pineapples more than Mwanja while Mary had half as many pineapples as Lucy. If the four shared 54 pineapples,

How many pineapples did each get?

11. The perimeter of a rectangle is 24cm. If it’s length is twice it’s width. Calculate its area.

12. Three sides of a rectangle in order are (3x)cm , (x+2)cm and (2x+6)cm. Find the perimeter and area.

13. The length of a rectangle is 2cm more than its width. Find it’s area if the perimeter is 20cm.

14. The width of a rectangle is 3cm less than its length. Its perimeter is 22cm. Find its area.

15. The sides of a square are (4x+4)cm and (3x+6)cm. find its perimeter and area.

16. The breadth of a rectangle is one third of its length. If the perimeter of the rectangle is 32cm, find it its area.

17. The length of one side of a rectangle is (2m-1) cm, the other side is (m+3)cm. If the rectangle has a perimeter of 28cm, what is its

**APPLICATION OF ALGEBRA INVOLVING POLYGONS**

* A polygon is a plane figure/shape enclosed by line segments called sides.
* Polygons are named according to their number of sides.
* They are either regular or irregular.
* Regular shapes/polygon have equal angles and equal shapes

**TYPES OF REGULAR POLYGONS**

|  |  |
| --- | --- |
| **Types** | **No. Of sides** |
| Triangle  Square  Pentagon  Hexagon  Heptagon  Octagon  Nonagon  Decagon  Hendecagon  Dodecagon | 3  4  5  6  7  8  9  10  11  12 |

**NOTE:** A twenty sided polygon is called **Ico-sagon**

* The number of exterior, interior and centre angles are always equal for a particular polygon.
* The number of sides of a regular polygon affects the sizes of each exterior angles, interior angles,
* centre angle and total interior angle sum.

**Relationship between number of sides and exterior angles of regular polygons:**

* The sum of the exterior angles is 3600
* For a regular polygon, the exterior angles are equal
* Exterior angle =
* Exterior angle+ Interior angle = 1800
* No. of triangles = n-2
* No. of right angles = 2(n-2)

**APPLICATION OF ALGEBRA INVOLVING POLYGONS:**

1. The interior angle of a regular polygon is twice its exterior angle, find the number of sides of the polygon.

Let the exterior angle be represented by letter k

|  |  |  |
| --- | --- | --- |
| Exterior angle | Interior angle | Angle sum |
| k | 2k | 1800 |

k + 2k = 1800

3k = 1800

=

**k = 600**

**Exterior angle = 600**

b) Name the polygon.

No. Of sides =

=6 sides

**A hexagon is a six sided polygon**

c) Calculate its interior angle sum.

**Approach one Approach two**

Int angle sum = 1800(n-2) OR 900(2n-4)

1800(6-2) 900 [(2 x 6) -4]

1800 x 4 900(12-6)

**= 7200** 900 x 6

**= 7200**

2. The exterior angle of a regular polygon is 900 less than its interior angle. Name the polygon.

Let the interior angle be represented by letter y

|  |  |  |
| --- | --- | --- |
| Interior angle | Exterior angle | Sum |
| y | (y -90)0 | 1800 |

Interior angle + Exterior angle = 1800

y + y – 900  = 1800

2y- 90 = 1800

2y – 900 + 900  = 1800 – 900

2y = 900

= ˚

*y = 45°*

No. of sides =

**= 8 sides**

**The polygon is an octagon**

4.The interior angle of a regular polygon is 9 times the exterior angle.

a) Find the exterior angle b) How many sides has the above polygon

c) Calculate the interior angle sum of the polygon.

5. The interior angle and exterior angle of a regular polygon are in the ratio of 5:1

a) Find the interior and exterior angle of the polygon

b) Name the polygon

c) Calculate the interior angle sum

6. The interior angle sum of a polygon is 900˚. Find the number of sides of the polygon.

b) Name the polygon

c) How many triangles are in the polygon above?

d) Find the number of right angles

7. Calculate the interior angle sum of a polygon with 9 sides.

8. Name the polygon whose exterior angle is 40°

9. The size of each interior angle of a regular polygon is 144°. Find the exterior angle of the polygon.

b) Name the polygon

c) Calculate it's interior angle sum.

10.The interior and exterior angles of a regular polygon are in the ratio of 3:2. Calculate the number of right angles in the polygon.

11. Calculate the exterior angle of a regular decagon.

b) Find the interior angle of the polygon

12.The interior angle of a regular polygon is 100° more than the exterior angle.

a) Calculate the size of each exterior and interior angle.

b) Name the polygon.

**TO BE CONTINUED………………………**