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ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

Annual Examination

MODEL ANSWER

Sub: Algebra & Geometry **Class: VII** **FM: 90**

Duration: 2 hrs 30 mins **Date: 18.11.19**

Group – A

1) Choose the correct option : (1 X 5 = 5)

i) Which of the following is a binomial?

a) 8x+x b) $12a^2+7b+5c$ c) 5a x 7b x 8c d) $12(a^3 + a)$

Ans: d) $12(a^3 + a)$

ii) $(a - b)^2 + 4ab$ equals

a) $a^2 - b^2$ b) $(a + b)^2$ c) $(a - 2b)^2$ d) $a^2 + b^2$

Ans: b) $(a + b)^2$

III) The angle at the vertex of an isosceles triangle is four times its base angles. The angle at the vertex is

a)20° b)80° c)120° d)30°

Ans: c)120°

iv) The number of letters in the word SNAIL that have symmetry is

a)0 b)1 c)2 d)3

Ans: c)2

v) Which ordered pair describes the point (2,5) shifted 3 units right and 2 units down?

a) (0,8) b) (5,3) c) (2,3) d) (5,5)

Ans: b) (5,3)

2) Fill in the blanks : (1 X 10 = 10)

i) y = a is a line parallel to _____ axis.

Ans: X

II) The point (2,3) lies in _____.

Ans: first quadrant

iii) The value of (x+a)(x + b) is _____.

Ans: $x^2+(a+b)x+ab$

iv) The greatest common factor of $25\,a^3\,b^7$ and $35\,a^7\,b^3$ is _____.

Ans: $5a^3b^3$

v) Each of the acute angles of a right angled isosceles triangle is____.

Ans: 45^0

vi) The triangle with the side lengths 3,4 and 5 form a _____ triangle.

Ans: scalene

vii) An exterior angle of a triangle is always _____ than either of the interior opposite angles.

Ans: greater

viii) The measure of two supplementary angles are in the ratio of 7:5. The measure of the smallest angle is_____.

Ans: 75^0

ix) The degree of $8a^3b^5 + a^2b^2$ is _____.

Ans: 8

x) If a=2, b=1 and c=10 then find the value of $3b(a^3-c)$

Ans: (-6)

3) Write true or false : (1 X 5 = 5)

i)The sum of two acute angles can be 180°

Ans: false

ii) The two angles are equal and complementary, then each angle is 45°

Ans: true

iii) A radius is a chord of a circle.

Ans: false

iv) The side opposite to right angle is called perpendicular

Ans: false

v) The measure of each angle of an equilateral triangle is 60°

Ans: true

4) Answer in One word (1 x 5 = 5)

i) The sum or difference of three monomials

Ans: trinomial

ii) Three or more points which lie on the same line.

Ans: colllinear points

iii) In a right angled triangle the side opposite to the right angle.

Ans: hypotenuse

iv) What is the line of symmetry that divides the figure into two congruent halves called?

Ans: axis of symmetry

v) A triangle with none of the sides equal.

Ans: scalene

Group – B

5) Answer the following questions:- (2 X 5 =10)

i) What is centre of rotation?

Ans: A rotation turns a shape through an angle about a fixed point, called centre of rotation

ii) Draw the geometric figure of any angle with equal arms and its line symmetry.

Ans: Students may draw a square where they can show any angle with equal arms and its line symmetry.

iii) Factorise: $5x + 10y - 7 (x + 2y)^2$

Ans: $5x + 10y - 7 (x + 2y)^2$

$= 5(x+2y) - 7 (x + 2y)^2$

$=(x+2y) \{ 5-7 (x+2y)\}$

$=(x+2y) (5-7x -14y)$

iv) Subtract a-b+c from 2a+b-c.

Ans: $(2a+b-c)-(a-b+c)$

$= 2a+b-c-a+b-c$

$=a+2b-2c$

v)What are quadrants?

Ans: The coordinate axes separate the plane into four regions, called quadrants.

6) Answer the following questions: (Any Five)

(3 x 5 = 15)

i)What must be added to $3a^3-4a+6$ to get $7a^3-4a^2+10a-6$?

Ans: $(7a^3-4a^2+10a-6) - (3a^3-4a+6)$

$= 4a^3-4a^2+ 14a-12$

Ii) How many sides has a polygon if the sum of its interior angles is 18 right angles.

Ans: Let the polygonhave n sides. Then (2n-4) rt <s=18 rt <s

2n-4=18

or n=11

The polygon has 11 sides.

iii) Find the value $(121)^2 - (119)^2$

Ans: $(121)^2 - (119)^2$
$=(121+119)(121-119)$
$= 240 \times 2$
$=480$

iv) Of the three angles of a triangle, one is three times the smallest angle and the other is five times the smallest angle. Find the angles.
Ans: Let the smallest angle be x^0. Therefore according to the conditions given,
$X+3x+5x=180^0$
Or $9x=180^0$
Or $x= 20^0$
The other angles are 60^0, 100^0

v) Draw a line segment AB=8.2 cm. Mark a point M on AB such that AM=5.7 cm. Draw a perpendicular to AB at M.
Ans: Students should draw the required line segment AB=8.2 cm. Then mark a point M on AB such that AM=5.7 cm. Then construct a perpendicular to AB at M.

vi) Given a circle with centre O and radius 3.5 cm, what is the length of the longest chord of the circle. Name the longest chord.
Ans: The longest chord is diameter. As diameter= 2x radius so here
diameter= 2x 3.5cm
=7cm

vii) Simplify: $(a+7)^2 + (a-7)^2$
Ans: $(a+7)^2 + (a-7)^2$
$= a^2+2a7+49 + a^2-2a7+49$
$= 2a^2+98$

Group – C

7) Answer the following questions: (Any eight)
(5 X 8 = 40)

i) Simplify $8x^3y + 7x^2y(3x-4y)+ 2xy(-3x^2+4y)$
Ans: $8x^3y + 21\,x^3y - 28x^2y^2 - 6\,x^3y + 8xy^2$
$= 23\,x^3y - 28x^2y^2 + 8xy^2$

ii) Divide $x^4 + x^3 - 2x^2 + 4x-10$ by $(x-2)$
Ans: Quotient= $x^3+3x^2+4x+12$ and Remainder = 14

iii) If $(4x+28)°$ and $(x-8)°$ are supplementary angles, find x
Ans: According to the condition,

$(4x+28)° + (x-8)° = 180^0$
or $x = 32^0$
iv) An angle is 30° less than three times its complement. Find the angle.
Ans: Let the angle be x. So its complementary angle be 90-x.
Now according to the condition,
$X = 3(90-x) - 30$
Or $x = 60^0$
v) Factorise: $2b^2 + 8ab + 4ac + bc$.
Ans: $2b^2 + 8ab + 4ac + bc$.
$= 2b(b+4a) + c(b+4a)$
$=(b+4a)(2b+c)$
vi) Find the product of $(5x^2 - 4y^2)(5x^2 - 4y^2)$
Ans: $(5x^2 - 4y^2)(5x^2 - 4y^2)$
$= 25x^4 - 40x^2y^2 + 16y^4$
vii) Draw the graph of the equation $y=2x+5$.
Ans: Students should draw the graph of the equation $y=2x+5$. They must consider any 5 values of x and find out accordingly the values of y.
viii) One angle of a seven sided polygon is 138°, and each of the other six angles is x°. Find the value of x.
Ans: One angle of a seven sided polygon is 138°, and each of the other six angles is x°. According to the questions, $6x+138=(14-4)90^0$
Or $x=127$
ix) PA and PB are two tangents to the circle with centre O drawn from the external point P. If PA = (3x - 2) units and PB = (5x – 8) units, then find the length of PA.
Ans: PA and PB are two tangents to the circle with centre O drawn from the external point P. If PA = (3x - 2) units and PB = (5x – 8) units then according to the condition,
$3x-2=5x-8$
or $x=3$
$PA=(3x-2)=9-2=7$
x) Find the continued product of $(x + 3)(x - 3)(x^2 + 9)$
Ans: $(x + 3)(x - 3)(x^2 + 9)$
$=\{(x+3)(x-3)\}(x^2 + 9)$
$=(x^2-9)(x^2+9)$
$=(x^2)^2-(9)^2$
$= x^4-81$