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# ST. LAWRENCE HIGH SCHOOL

## A JESUIT CHRISTIAN MINORITY INSTITUTION

### Third Term Examination – 2018

Sub: Algebra and Geometry          Class -7          F. M. 90

**Model Answer**                                    Date: 17/11/2018

## Group-A

1. Choose the correct alternative.
2. i) Degree of $5+2y+2y^2$ is     c) $\underline{2}$

   ii) Product of $-8x^2y$ and $3 x^3y^3$ is   a) $\underline{-24 x^5y^4}$

   iii) By how much is $a^4- 6a^2b^2+b^4$ more than $a^4+ 4a^2b^2 +b^4$?

   c) $-\underline{10a^2b^2}$

   iv) Supplement angle of $84^o$   c) $\underline{106^o}$

   v) In a triangle $<A=52^o$ , $<B=55^o$ and  $<C$ is   b) $\underline{73^o}$

2. Fill in the blanks.

   i) A triangle with all three unequal sides is called <u>sclcene triangle</u>

   ii) Arranging $8x^2-3x^4-12 +6x^3$ in order of decreasing degree in x we    have - <u>$3x^4+6x^3+8x^2-12$</u>

   iii) In a right triangle <u>hypotenuse</u> is the longest side.

   iv) If  $\frac{n}{2}+\frac{n}{5}=7$,  n= $\underline{10}$

   v) Expanding $(a+x)^2$ we have $\underline{a^2+2ax+x^2}$

3. write True or False.

   i) products of $(b-9)(b+9)$ is $b^2-81$. True

   ii) Factors of $ax-bx+x$ are  $x(a+b+1)$. False

   iii) A simple closed plane figure bounded by line segments is called a polygon. True

   iv) A nonagon has 10 sides. False

v) After factorizing $5 - 20x^2$ we get $5(1+2x)(1-2x)$ True

4. Answer the following.

i)Factorise: $3a^3-48a$

Ans. $3a(a+4)(a-4)$

ii)Find the value of x,If $\frac{2x}{3}=8$.

Ans $x=12$

iii) Find the value of x if angle 3x and 6x form a right angle together.

Ans. $x=10$

iv)Define equilateral triangle.

Ans. A triangle having all the sides equal is called equilateral triangle.

v) If $-\frac{4}{5}y=-12$, then find the value of y.

Ans. $y=15$

vi)Factorise: $25x^2-49y^2$

Ans.$(5x+7y)(5x-7y)$

vii)If C=10 and b=1 then find the value of $(c+b)^2$

Ans. $(c+b)^2=121$

viii)what is concave polygon?

Ans. A polygon having atleast one interior angle as greater than $180^o$ is called concave polygon.

ix)Find the product $(x+2)(x+3)$.

Ans. $x^2+5x+6$

x)Find the sum of the interior angles of a regular heptagon.

Ans $(2n-4)\times90^o=(2\times7-4)\times90^o=900^o$

## Group-B

5. Answer the following.

i)Factorise : $(m-9)^2 + (9-m)$

Ans. $(m-9)^2 + (9-m)$

$= (m-9) [(m-9)-1] = (m-9)(m-10)$

ii)Find the product $(x+\frac{4}{7})( x-\frac{5}{7})$

Ans. $x^2- 5x/7 +4x/7 -20/49 = x^2-x/7 -20/49$

iii)write down the squares of $(3y^2-4z^2)$

Ans. $(3y^2-4z^2)^2= (3y^2)^2 -2 . 3y^2 \cdot 4z^2+(4z^2)^2= 9y^4-24y^2z^2+16z^4$

iv)differentiate between chord and diameter.

Ans.A line segment passing through the centre and having its end points on the circles is called diameter. A line segment joining any two points on the circle is called is called chord.

v)Factorise: $225p^{12}-9q^6$

Ans. $(15p^6)^2-(3q^3)^2= (15p^6+3q^3)(15p^6-3q^3)=3 \times 3 (5p^6+q^3)(5p^6-q^3)$

6. Answer the following.      (any 5)

i)With an  example explain what is complementary angle.

Ans. When two angles sum upto $90,^o$ they are called complementary angles.

$40^o$ and $50^o$ angles are complementary angle of each other.

ii)Factorise: $81x^4-y^4$

Ans. $(9x^2)^2- (y^2)^2 =(9x^2 + y^2) (9x^2 -y^2)= (9x^2 + y^2)(3X+y)(3x-y)$

iii)Evaluate using identities: $(105)^2$

Ans. $(100+5)^2= (100)^2+2 \times 100 \times 5+(5)^2 =10000+1000+25=11025$

iv)In a equilateral triangle measure of two sides are 5y and 3y +16 .Find the length of each side.

Ans. $5y= 3y+16$ or, $y=8$  therefore each side is  $5\times8=40$ units.

V) ABC is a triangle BC is extended on right hand side to D and on left hand side to E. $<ACD= 120^o$ and $<ABE=105^o$ Find out $<BAC$.

Ans.∠ABC= 180-105= 75°, ∠ACB= 180-120=60°, ∠BAC=180- (75+60)=45°

vi)Find out supplement of 129°43'24".

Ans.179°59'60" -129°43'24"= 50°16'36"

vii) Find out measure of each interior angle of a regular nonagon.

Ans sum of all interior angles= (2x9 -4) x 90°=1260°

Each angle= 1260°/9=140°

## Group-C

7. Answer the following.  (any  8)

i)Simplify: (4a -3b +11c) (a+b) – (16b-13c+2a)(a-c)

Ans.$4a^2+4ab- 3ab – 3b^2 +11ac+11bc-(16ab – 16bc-13ac+13c^2+2a^2-2ac)$

$=2a^2-13c^2-3b^2- -15ab+26ac+27bc$

ii)solve: $\frac{x+3}{2} - \frac{3x+1}{4} = \frac{2(x-2)}{3}$ -2

Ans.$\frac{2(x+3)-(3x+1)}{4} = \frac{2(x-2)-6}{3}$

Or-x+5/4= 2x-10/3

Or, -3x+15=8x-40  or, -11x = -55    or, x=5

iii)The sum of two numbers is 64 and the second number is 16 less than the first. Find the numbers.

Ans, x+x-16 =64  or, 2x= 64+16   or, x=40     therefore x-16= 40-16=24

iv)Construct an angle of 120°.Divide it into four equal parts using cpmpass.

Ans. Comstruct an angle of 120 ° Then bisect it into two parts . Each part is equal to 60°. Next bisect each 60° into two parts. Each will be equal to 30°.

v)Divide: a) $x^2$-3x +2 by x-2

Ans.  $\frac{x2-3x +2}{x-2}$ =x-1

 b) $-48x^2yz$ by $-60xy^2z^3$

Ans.  $\frac{-48x2yz}{-60xy2z3}$    = 4x/5yz²

vi) simplify: $\dfrac{297x297-203x203}{94}$

Ans. $297^2-203^2/94 = (297+203)(297-203)/ 94=500$

vii) Find the number of sides of the polygon if the sum of its interior angle is 20 rt angles.
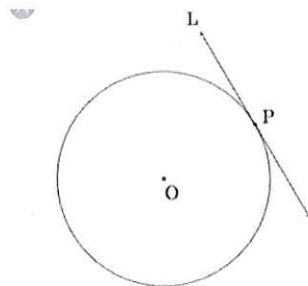
Ans. $(2n-4) \times 90= 20 \times 90$  or, $180n-360=1800$  or, $n=12$

viii) Define concentric circles and tangent of a circle with example.

Ans. Circles with same centre and different radius are called concentric circles.



A tangent is a line in the same plane as a circle that intersects it at exactly one point.



ix) Plot the points (-5,4), (-8,4),(0,4), (3,4) and (6,4)

x) One number is 7 times another number . If 14 is added to the sum of the numbers, the result is 38. Find the numbers.

Ans. $x+7x+14=38$  or. $8x=24$  or, $x=3$    $7x=7x3=21$