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ST. LAWRENCE HIGH SCHOOL

2ND TERM EXAMINATION

Subject: ALGEBRA / GEOMETRY **MODEL ANSWER**

Class: VIII **F. M. 80** **Date: 08.08.2019**

Group A

Q1. Select the correct alternative. 1 x 5 = 5

i. The fourth angle of the quadrilateral that with three acute angles is
   a. acute   b. right   **c. obtuse**   d. none of these

ii. The value of x, if $16x = 62^2 - 26^2$ is
   a. 162   **b. 198**   c. 196   d. none of these

iii. Angle in a semicircle is
   a. 90^0   b. 180^0 c. 360^0 d. none of these

iv. The three angles of a quadrilateral are of a quadrilateral are 110^0, 71^0 and 70^0. Therefore its fourth angle is
   a. 109^0   b. 79^0 c. 180^0 d. none of these

v. $2^{n-1} + 2^{n+1} = 320$, then n is equal to
   a. 6   b. 8   c. 5   **d. none of these**

2. Fill in the blanks: 1 x 5 = 5

i. The diagonals of parallelogram are ......equal

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

iii. $(x - 2)(x + 2)$ = -------------$(x^2 - 4)$

iv. A quadrilateral has --4-------- pairs of adjacent angles.

v. The perpendicular from the centre of the circle to the chord ---perpendicular---to the chord.

3. Write True or False. 1 x 4 = 4

i. The opposite angles of a cycle quadrilateral are equal.   False

ii. All squares are rectangle.   True

iii. The line joining centre of the circle to the midpoint of the chord is perpendicular to the chord.   True

iv. ABCD is a quadrilateral with angles 190^0, 80^0, 110^0, 80^0.   False

Group B

4. Answer any eight of the following questions. 2 x 8 = 16

i. Find the square of (x + 1/x)

Ans. $x^2 + \frac{1}{x^2} + 2$.

ii. What is the difference between a rhombus and kite.

Ans. In rhombus sides are equal but in kite sides are not equal.

iii. What must be subtracted from $4a^2 + 9b^2$ to make it a perfect square?

Ans. 12ab

iv. Without actual multiplication find the value of 41 x 39?

Ans. $(40+1)(40-1) = 40^2 - 1 = 1599$

v. Factorise $x^4 - 11x^2 - 80$.

Ans. $X^4 - 16x^2 + 5x^2 - 80 = (x^2 - 16)(x^2 + 5) = (x+4)(x-4)(x^2 + 5)$

vi. Each exterior angle of regular polygon is 72^0. Find the number of sides of that regular polygon.

Ans. Since $360^0 / 72^0 = 5$. Hence pentagon

vii. What is the area of a square whose one side is $(\frac{4}{3}a - 6b)$ cm.

Ans. $(\frac{16}{9}a^2 + 36b^2\ 16ab)$ sqcm.

viii. Is it possible to draw a polygon with exterior angles 72^0.

Ans. Yes, pentagon.

ix. Divide $a^4 - b^4$ by $a - b$.

Ans. $(a + b)(a^2 + b^2) = a^3 + a^2b + ab^2 + b^3$

x. One angle of a parallelogram is 48^0. Find its opposite angle and adjacent angle.

Ans. opposite angle $= 48^0$ and adjacent angle $= 132^0$

Group C

5. Answer any nine of the following questions.   5 X 9 = 45

i. Facorise $6x^6 - 21x^4 - 12x^2$.

Ans. $3x^2(2x^4 - 7x^2 - 4) = 3x^2(2x^4 - 8x^2 + x^2 - 4) = 3x^2(2x^2 + 1)(x^2 - 4) = 3x^2(2x^2 + 1)(x + 2)(x - 2)$

ii. The angles of a quadrilateral are in the ratio 2:3:5:8. Find the measure of each of the four angles.

Ans. Since $(2k + 3k + 5k + 8k) = 360^0 \Rightarrow k = 20$. So the angles are respectively $40^0, 60^0, 100^0, 80^0$.

iii. Prove that sum of the exterior angles of a quadrilateral when produced in order is 360^0

Ans. Let the interior angles are A^0, B^0, C^0, D^0. So after producing each side in seme order and each exterior angle becomes $(180^0 -$ the same angle$)$. Hence sum of the exterior angles
180^0 X $4 - (A^0 + B^0 + C^0 + D^0) = 360^0$.

iv. Draw a square of side 5cm.

v. Multiply $(x^2 + xy - y^2)$ by $(x^2 - xy + y^2)$

Ans. $\{x^2 + (xy - y^2)\}\{x^2 - (xy - y^2)\} = x^4 - (xy - y^2)^2 = x^4 - y^4 - x^2y^2 + 2xy^3$.

vi. In a circle of radius 5 cm, a chord is drawn at a distance of 4 cm from the centre. Find the length of the chord.

Ans. length of the chord $= 2\sqrt{5^2 - 4^2} = 6$ cm.

vii. Draw a quadrilateral ABCD in which AB= 8 cm, BC= 6 cm, CD= 4 cm, AD=5 cm and $<B = 60^0$

viii. In a quadrilateral ABCD, $<A = 30^0$, $<B = 96^0$. The angle bisectors of $<C$ and $<D$ meet at the point o. Find angle $<COD$.

Ans. $<C + <D = 360^0 - (30^0 + 96^0) = 234^0 \Rightarrow \frac{1}{2}(<C + <D) = 117^0 \Rightarrow <COD = 180^0 - 117^0 = 63^0$.

ix. Find the product $(1 + x)(1 - x^2)(1 - x)$.

Ans. $(1 - x^2)^2 = 1 + x^4 - 2x^2$.

x. If $a^2 + b^2 = 117$ and $ab = 54$, find $\frac{a+b}{a-b}$

Ans. $(a + b)^2 = 225 \Rightarrow (a + b) = 15$. $(a - b)^2 = 9 \Rightarrow (a - b) = 3$. So the given fraction $= 5$.

xi. Factorise $a^4 - 625$.

Ans. $a^4 - 625 = (a^2 - 25)(a^2 + 25) = (a+5)(a-5)(a^2 + 25)$

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