UANL
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Universidad Autónoma de Nuevo León
Sistema de Nivel Medio Superior
7 Preparatoria "Dr. Oscar Vela Cantú"

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ELABORATED BY: ACADEMY OF DEVELOPMENT OF ALGEBRAIC THINKING FIRST SEMESTER
ACADEMY CHIEF : DRA. ELOISA M. ESCAMILLA GARZA
EDUCATIONAL PROGRAM: BILINGUAL

STUDENT NAME:_____

GROUP:_____ N.L._____ GRADE:_____

CO-EVALUATION BY: _____

I. INSTRUCTIONS: Perform and answer the following exercises correctly. Remember that without the corresponding procedure the answer is not considered valid.

1. Make the sum of the following polynomials:
   A = 4x 3 – 12x 2 + 7x – 6, B = -4 -5x + 2x 3 – x 2, C = – 2x – 5x ^{3} +4 x 2 –2

a) $-x^3 + 4x^2 - 12$ b) $2x - 11x^3 - 9x^2$ c) $x^3 - 9x^2 - 12$ d) $-5x^3 + 4x^2 - 12$

2. Given the polynomials A, B, and C, where ,

$$A = \frac{5}{2}x - \frac{7}{8}y - \frac{7}{12}z \qquad B = \frac{3}{4}x + \frac{5}{4}y + \frac{5}{6}z \qquad C = \frac{2}{3}x - \frac{1}{2}y - \frac{3}{4}z$$

   subtract the third polynomial from the sum of the other two.

a) $\frac{31}{12}x + \frac{7}{8}y + z$ b) $\frac{31}{2}x + \frac{17}{6}y + z$ c) $\frac{30}{12}x + \frac{6}{64}y - z$ d) $\frac{47}{12}x - \frac{1}{8}y - \frac{1}{2}z$

3. Simplify $3a - 3\{b - 4[c + 2(a - b + 3c) - (a + 5c - 2b)]\} =$

a) $3a - 3b + 15c$ b) $24a - 3b + 15c$ c) $15a - 3b + 24c$ (d) $15a + 3b - 24c$

4. Perform the following multiplication: $xy^2(x^3 - 4x^2y + y^3 - 1)$

(a) $x^4y^2 - 4x^3y^3 + xy^5 - xy^2$ (b) $x^3y^2 + 4x^2y + xy^2 - y^2$
(c) (d) $x^5y^3 - 8x^3y^5 + xy^4 - 1$ $(d)x^5y^3 - 8x^3y^6 + xy^4 + 1$

5. Make the following division: $\frac{a^{-5}b^{-4}c^7}{a^3b^{-5}c^{-8}}$

a) $\frac{b}{a^8c}$ b) $\frac{b}{a^8c^{15}}$ c) a^8bc^{15} d) $\frac{bc^{15}}{a^8}$

6. Make the following division: $\left(\frac{9a^4b^2c^3}{63a^2b^{-3}c}\right)^{-2}\left(\frac{a^{-5}b^{-4}c^{-7}}{a^{-3}b^{-5}c^{-8}}\right) =$

a) $\frac{49}{a^6b^9c^3}$ b) $\frac{49b^9}{a^6c^3}$ c) $49a^2b^{11}c^5$ d) $7a^2b^{11}c^5$

7. Perform the following division: $\frac{6x^4y^2 - 4x^3y^3 + 8x^2y^4}{-2x^2y^2}$

(a) $-12x^6y^4 + 8x^5y^5 - 16x^4y^6$ $(b) -3x^2 + 2xy - 4y^2$ $(c)3x^2 - 2xy + 4y^2$ $(d)12x^2 + 8xy^2 - 16$

8. Perform the division: $(2x^4 + 3x^3 - x^2 + 5x - 1) \div (x - 2)$

a)$-2x^3 + 3x^2y^5 - 6x\ reminder\ 21$
b) $-3x^2 + xy - y^2\ reminder\ 20$
c) $2x^3 + 7x^2 + 13x + 31\ reminder\ 61$
d) $2x^3 + 8x^2 - 16x + 31\ reminder - 61$

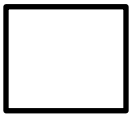
9. Perform the division: $\frac{x^3-7x+6}{x-1}$

a) $x^2 + x - 6$ b) $x^2 - 6$ c) $x^2 + x + 6$ (d) $x^2 - x - 6$

10. Determine the area of the rectangle in the following figure:

(a) $27x^3 - 81x^2 + 51x - 21$ (b) $27x^2 - 14x + 49$ $(c)9x^3 + 18x^2 - 42x + 21$
d) $12x^3 + 14x^2 + 49$

II. INSTRUCTIONS: In the following exercises solve using the necessary rule of notable products.

11. Determine the area of the following square:  $(9x - 5)$

(a) $18x^2 - 10$ (b) $81x^2 - 90x + 25$ $(c)\ 81x^2 - 25x$ $(d)\ 81x^2 + 90x + 25$

12. $(5x + 9)\ (5x - 9)$

(a) $25x^2 - 45$ $(b)\ 25x^2 - 81$ $(c)10x^2 - 18$ $(d)\ 25x^2 + 81$

13.$(j + 3)\ (j - 4)$

(a) $j^2 - 4j + 12$ (b) $j^2 - j + 12$ $(c)\ j^2 - j - 12$ $(d)j^2 + j + 12$

14.$(x + 4)(2x + 5)$

(a) $2x^2 + 20x + 13$ (b) $2x^2 - 18x + 20$ $(c)\ 2x^2 + 18x - 20$ $(d)2x^2 + 13x + 20$

15. $(\ x - 5)^3$

a) $x^3 + 15x^2 + 45x - 45$
b) $x^3 - 15x^2 + 30x - 75$
c) $x^3 - 15x^2 + 75x - 125$
d) $x^3 + 45x^2 - 15x - 95$

III. INSTRUCTIONS: In the following problems factorize completely the given algebraic expressions.

16. $x^3 - 2x^2 + x$

$a)\ x(x - 1)(x + 1)$ (b) $x(x - 1)(x - 1)$ $(c)\ x(x^2 - x)$ $(d)x(x^2 - 2x + 1)$

17. $9x^3 - 49x$

(a) $x(\ 3x + 7)(3x - 7)$ $(b)x(\ 9x^2 - 49)$ $(c)x(\ 9x^2 + 49)$ $(d)\ x(3x)(-7)$

18. $x^3y^2 - 4x^2y^2 - 21xy^2$

a) $xy^2\,(x+3)(x-7)$ b) $x^2y^2\,(x-3)(x+7)$ c) $xy(x^2y - 4xy - 21y)$ d) $xy^2\,(x^2 - 4x - 21)$

19. $-2x^2 + 5x + 12$

$a)\ (-x+3)(2x+4)$ b) $(-1)(2x+3)(x-4)$ c) $(-1)(2x+3)(x+4)$ d) $(\,2x+3)(-x+4)$

20. $5x^3y - 20xy$

a) $5x\,(\,x^2y - 4y)$ b) $5xy\,(\,x^2 - 4)$ c) $5xy\,(x+2)(x-2)$ d) $5xy\,(x-4y)$

21. $x^2\,(a+b) - (a+b)$

a) $(a+b)\,(\,x^2 - 1)$ b) $x^2\,(a+b)$ c) $x^2 - \,(a-b)^2$ d) $(a+b)\,(x+1)\,(x-1)$

22. $9x^2 - y^2$

a) $(3x+y)\,(\,3x-y)$ b) $9\,(x-y)^2$ c) $9\,(x^2 - y^2)$ d) $3x\,(3x - y^2)$

23. $y^2 - 4y + 4$

a) $(y+2)\,(\,y-2)$ b) $(y-2)^2$ c) $y\,(y-2)$ d) $(y+2)(y+2)$

24. $15\,x^2 + 6\,x + 20$

a) $(3x+4)(5x+5)$ b) *Prime polynomial* c) $(15x+20)(x+1)$ (d) $(3x+5)(4x+5)$

25. $a^3 + 64\,b^3$

a) $(a - 4b)(\,a^2 + 4ab + 16)$
b) $(a + 4b)\,(a^2 - 4ab + 16\,b^2)$
c) $(a + 8b)(\,a^2 - 16\,ab + 64\,b^2)$
d) $(b + 4a)(b^2 - 12ab + 16\,a^2)$

IV. INSTRUCTIONS: Simplify the following algebraic fractions.

26. $\frac{x^2+4x+16}{x^3-64}$

a) $x - 4$ b) $\frac{x-4}{x+4}$ c) $\frac{1}{x-4}$ d) $x + 4$

27. $\frac{x^2-5x+6}{x^2+2x-8}$

a) $\frac{x-1}{x-6}$ b) $\frac{x-3}{x+4}$ c) $\frac{1}{x+4}$ d) $\frac{1}{x-3}$

28. $\frac{x^2+7x}{x^3+5x^2-14x}$

a) $\frac{x+7}{x-14}$ b) $\frac{1}{x+2}$ c) $\frac{7}{x-2}$ d) $\frac{1}{x-2}$

29. $\frac{x^2+11x+18}{x^2+2x}$

a) $\frac{x+9}{x}$ b) $x + 9$ c) $\frac{x-9}{x}$ d) $\frac{x+9}{x-9}$

30. $\frac{5x+35}{x^2+9x+14}$

a) $\frac{5}{x+7}$ b) $x+2$ c) $\frac{5}{x+2}$ d) $\frac{x+7}{x+2}$

V. INSTRUCTIONS: Determine the solution set of the equations.

31. Clear the variable w: $\frac{1}{z}-\frac{1}{w}=\frac{1}{y}$

a) $\frac{y+z}{yz}$ b) $\frac{y-z}{zy}$ c) $\frac{yz}{y+z}$ (d) $\frac{yz}{y-z}$

32. Clear the variable "x" in $10ax - y = 6 + 2x$

a) $\frac{10a+2}{6+y}$ b) $\frac{6+y}{10a-2}$ c) $\frac{10a-2}{6+y}$ (d) $\frac{6-y}{10a+2}$

33. Solve the following equation: $2.6x + 9.34 = 6.3(2.1x - 8.5)$

a) $x = 3.97$ b) $x = 4.16$ c) $x = 19.1$ d) $x = 5.92$

34. Solve the following equation: $(3x + 2) - 4\,(x - 2) = 4\,(x - 5) + 3(2x - 1)$

b) $x = -3$ b) $x = 6$ c) $x = -1$ d) $x = 3$

35. $\frac{3x+5}{4} = \frac{2x-1}{3}$

a) $x = 19$ b) $x = -5$ c) $x = -3$ d) $x = -19$

36. Michelle has $1384 and saves $20 per day. Victoria has $2600 and spends $12 per day. "X" is the number of elapsed days. In how many days will they have the same amount of Money?

a) 152 b) 38 c) 32 d) 124.5

37. At a party the ratio of men to women is 5:2. If in the party the total number of people are 735. How many women there are?

a) 105 b) 210 c) 525 d) 325

38. A gas station finds that the sale of Magna gasoline exceeds premium gasoline in the ratio of 9:5. The monthly gas station fee is 28,000 liters, how many liters of each kind of gasoline must be ordered for the quota to have this ratio?

M= Magna

P= Premium

a) $M = 16{,}000 \; and \; P = 8{,}000$
b) $M = 2{,}000 \; and \; P = 4{,}000$
c) $M = 18{,}000 \; and \; P = 10{,}000$
d) $M = 9{,}000 \; and \; P = 5{,}000$

39. Solve the system of equations using the elimination method:

$6x - 5y = 28$
$4x + 9\,y = -6$

a) $(-3,\ 5)$ b) $(3, -2)$ c) $(-2,\ 3)$ d) $(5, -3)$

40. Solve the system of equations using the substitution method

$2x - 9y = 14$
$6x - \ y = 42$

a) $(7,\ 0)$ b) $(0,\ 7)$ c) $(14,\ 1)$ d) $(6,\ 0)$

41. If 12 kg of potatoes and 6 kg of rice cost \$102, while 9 kg of potatoes and 13 kg of rice cost \$153. What is the price per kg of each product?

1 Kg potato = p

1 Kg rice = r

$a)\ p = \$6\ and\ r = \$11$ b) $p = \$8\ and\ r = \$18$ c) $p = \$4\ and\ r = \$9$ d) $p = \$16\ and\ r = \$36$

VI. INSTRUCTIONS: Find the solution set.

42. $16 - |8x + 20| = 48$

a) $S = \{1.5\,, -1.5\}$ b) $S = \{1\,,\ 12\}$ c) $S = \{\emptyset\}$ d) $S = \{1\,, -8\}$

43. $|10x - 14| + 10 = 64$

a) $S = \{4\,,\ 12.6\}$ b) $S = \{-4,\ 6.8\}$ c) $S = \{-6.8,\ 4\}$ d) $S = \{-12.6\,, 4\}$

VII. INSTRUCTIONS: Solve the following quadratic equations by the indicated method.

Solve by factorization:

44. $3x^2 + 10x + 8 = 0$

a) $S = \left\{\frac{-2}{5}\,, 1\right\}$ b) $S = \left\{-3,\ \frac{-1}{3}\right\}$ c) $S = \left\{-2,\ \frac{-4}{3}\right\}$ d) $S = \left\{\frac{4}{3}, 2\right\}$

Solve using absolute value:

45. $(x + 8)^2 - 7 = 29$

a) $S = \{2\,, -4\}$ b) $S = \{\ \ \}$ c) $S = \{-2, -14\}$ d) $S = \{2,4\}$

46. $(x - 2.5)^2 = 12.25$

b) $S = \{-6\,, 1\}$ b) $S = \{\ \ \}$ c) $S = \{1, 6\}$ d) $S = \{6, -1\}$

Solve by the Quadratic Formula:

47. $2x^2 - 5 = -9x$

a) $S = \{-5\,, 5\}$ b) $S = \left\{-5, \frac{1}{2}\right\}$ c) $S = \left\{-5, -\frac{1}{2}\right\}$ d) $S = \left\{-5, \frac{1}{4}\right\}$

For the following exercises, solve the situations by modeling a quadratic equation and solve by any method to solve the quadratic equations.

48. Find an integer knowing that the sum with its inverse is $\frac{15}{6}$

49. Paco is 4 years younger than Luis. The product of the numbers expressing their ages is 96. What is the age of each of them?.

50. The sum of two numbers is 19 and its product is 84. Find those numbers.