Grade 9 Assignment memo - Part A

February 2023

1. $5p - 2p(p+3)$
$= 5p - 2p^2 - 6p$
$= -p - 2p^2$

2. $2x(3x - y - 4)$
$= 6x^2 - 2xy - 8x$

3. $\frac{2}{3}x(9x - 6y + 4)$
$= 6x^2 - 4xy + \frac{8}{3}x$

4. $4y - 3y(2y - \frac{1}{3})$
$= 4y - 6y^2 + y$
$= 5y - 6y^2$

5. $(4 + xy)(2 + xy)$
$= 8 + 4xy + 2xy + x^2y^2$
$= 8 + 6xy + x^2y^2$

6. $(2x - 3)(3x + 2)$
$= 6x^2 + 4x - 9x - 6$
$= 6x^2 - 5x - 6$

7. $2(2x - 3y)^2$
$= 2(2x - 3y)(2x - 3y)$
$= 2(4x^2 - 6xy - 6xy + 9y^2)$
$= 8x^2 - 24xy + 18y^2$

8. $(4a - \frac{1}{2})(4a + \frac{1}{2})$
$= 16a^2 - \frac{1}{4}$

9. $(2t - \frac{1}{3})^2$
$= (2t - \frac{1}{3})(2t - \frac{1}{3})$
$= 4t^2 - \frac{2}{3}t - \frac{2}{3}t + \frac{1}{9}$
$= 4t^2 - \frac{4}{3}t + \frac{1}{9}$

10. $\frac{x}{4}(12x - 8 + \frac{4}{x^2})$
$= 3x^2 - 2x + \frac{1}{x}$

11. $(\frac{1}{4}m + \frac{1}{3}n)(\frac{1}{4}m - \frac{1}{3}n)$
$= \frac{1}{16}m^2 + \frac{1}{12}mn - \frac{1}{12}mn - \frac{1}{9}n^2$
$= \frac{1}{16}m^2 - \frac{1}{9}n^2$

12. $(x - 4)(x + 4)(x^2 + 16)$
$= (x^2 - 16)(x^2 + 16)$
$= x^2 - 256$

13. $(4p - \frac{1}{2}r)(p^2 - 2pr + 6r)$
$= 4p^3 - 8p^2r + 24p^2 - \frac{1}{2}p^2r + pr - 3r^2$
$= 4p^3 - 8\frac{1}{2}p^2r + 24p^2 + pr - 3r^2$

14. $2\{(5 + 2x) + x - 3(x + 1)\}$
$= 2\{5 + 2x + x - 3x - 3\}$
$= 2\{2\}$

15. $3(x-1)^2 - 4(3x-2) - (x-4)(x+4)$
$= 3(x^2 - 2x + 1) - 12x + 8 - (x^2 - 16)$
$= 3x^2 - 6x + 3 - 12x + 8 - x^2 + 16$
$= 2x^2 - 18x + 27$

16. $3y - 2[y + 3(-x + 2y) + 2y(4y - 2$
$= 3y - 2[y - 3x + 6y + 8y^2 - 4x$
$= 3y - 2y + 6x - 12y - 16y^2 + 8x$
$= -11y + 6x - 16y^2 + 8xy$

17. $p - [2p + 3\{7 - 2(5 - p)\} + 4]$
$= p - [2p + 3\{7 - 10 + 2p\} + 4]$
$= p - [2p + 3\{-3 + 2p\} + 4]$
$= p - [2p - 9 + 6p + 4]$
$= p - [8p - 5]$
$= p - 8p + 5$
$= -7p + 5$

18. $(x-7)^2 - 2(x-5)(x+5) - 2x(x+1$
$= x^2 - 14x + 49 - 2(x^2 - 25) - 2x^2 - 2$
$= x^2 - 14x + 49 - 2x^2 + 50 - 2x^2 - 2$
$= -3x^2 - 34x + 99$

19. $-3(8c - 4d) + 4a - 2[b - 3(4c - 2d)]$
$= -24c + 12d + 4a - 2[b - 12c + 6d]$
$= -24c + 12d + 4a - 2b + 24c - 12d$
$= 4a - 2b$

20. $\frac{x^2}{y^3}\left(y^2 - \frac{y^3}{x^2}\right)$
$= \frac{x^2}{y} - 1$

21. $6m^3 + 3m^2 + 4m$
$= 2m(3m^2 + m + 2)$

22. $a^2b^2 - ab$
$= ab(ab - 1)$

23. $x(x-1) - 6(x-1)$
$= (x-1)(x-6)$

24. $-2x^2 + 32x^3y^4$
$= -2x^2(1 - 16xy^4)$

25. $x^2(x+4) + 4x(x+4) - 12(x+4)$
$= (x+4)(x^2 + 4x - 12)$
$= (x+4)(x+6)(x-2)$

26. $-16a^2b^5 + 4ab - 8a^3b^2$
$= -4ab(-4ab^4 - 1 + 2a^2b$

27. $x^2 - 16$
$= (x+4)(x-4)$

28. $x^3 + x^2y - 4x - 4y$
$= x^2(x+y) - 4(x+y)$
$= (x+y)(x^2 - 4)$
$= (x+4)(x+2)(x-2$

29. $x^2(m-2) + y(2-m)$
$= x^2(m-2) - y(m-2)$
$= (m-2)(x^2 - y)$

30. $81 - p^8$
$= (9 + p^4)(9 - p^4)$
$= (9 + p^4)(3 + p^2)(3 - p^2)$

31. $x^2 - 2x - 15$
$= (x - 5)(x + 3)$

32. $6a^3(x+y) + a(y+x)$
$= (x+y)(6a^3 + a)$

33. $3x(p-2q) - 12y(2q-p) + 6z(p-2q)$
$= 3x(p-2q) + 12(p-2q) + 6z(p-2q)$
$= (p-2q)(3x + 12 + 6z)$
$= 3(p-2q)(x + 4 + 2z)$

34. $4a^2 - 25b^2$
$= (2a + 5b)(2a - 5b)$

35. $4x^6 - \frac{1}{9}$
$= (2x^3 - \frac{1}{3})(2x^3 + \frac{1}{3})$

36. $9(x-y)^2 - 16r^2$
$= [3(x-y) + 4r][3(x-y) - 4$
$= [3x - 3y + 4r][3x - 3y - 4r]$

37. $p^2 - 4p + 3$
$= (p - 3)(p - 1)$

38. $x^2 - 3x - 18$
$= (x - 6)(x + 3)$

39. $3y^3 - 6y^2 + 3y$
$= 3y(y^2 - 2y + 1)$

40. $7p(2p - 3q) - (3q - 2p)$
$= 7p(2p - 3q) + (2p - 3q)$
$= (2p - 3q)(7p + 1)$

41. $x^4 - 13x^2 + 36$
$= (x^2 - 9)(x^2 - 4)$
$= (x+3)(x-3)(x+2)(x-2)$

42. $y(y-1) - 12$
$= y^2 - y - 12$
$= (y - 4)(y + 3)$

43. $\frac{1}{2}y^2 + y - 4$
$= \frac{1}{2}(y^2 + 2y - 8)$
$= \frac{1}{2}(y + 4)(y - 2)$

44. $x^2 - 2xy - 15y^2$
$= (x - 5y)(x + 3y)$

45. $\dfrac{2ab^2 - 4a^2b}{b^2}$

$= \dfrac{2ab(b - 2a)}{ab}$

$= 2(b - 2a)$

46. $\dfrac{3x^2 + 6x}{x^2 - 4}$

$= \dfrac{3x(x+2)}{(x-2)(x+2)}$

$= \dfrac{3x}{x-2}$

47. $\dfrac{25 - 5t}{t^2 - 25}$

$= \dfrac{5(5-t)}{(t+5)(t-5)}$

$= \dfrac{-5(t-5)}{(t+5)(t-5)}$

$= \dfrac{-5}{t+5}$

48. $\dfrac{16a^2b - 8ab}{6 - 12a}$

$= \dfrac{8ab(2a-1)}{6(1-2a)}$

$= \dfrac{4\ 8ab(2a-1)}{-6_3(2a-1)}$

$= -\dfrac{4ab}{3}$

49. $\dfrac{y}{2} - \dfrac{1}{3y} + \dfrac{y-2}{y^2}$

$= \dfrac{y(3y^2) - 1(2y) + (y-2)(3)}{6y^2}$

$= \dfrac{3y^3 - 2y + 3y - 6}{6y^2}$

$= \dfrac{3y^3 + y - 6}{6y^2}$

50. $3x - \dfrac{4x+1}{6} + \dfrac{5}{2} - \dfrac{}{}$

$= \dfrac{3x(6) - (4x+1) + 5(3) - }{6}$

$= \dfrac{18x - 4x - 1 + 15 - 2}{6}$

$= \dfrac{12x + 14}{6}$

$= \dfrac{2(6x+7)}{6_3}$

$= \dfrac{6x+7}{3}$

51. $\frac{2}{p} + \frac{1}{p^2} - \frac{1}{3} + \frac{5}{3p}$

$= \frac{2(3p) + 1(3) - 1(p^2) + 5(p)}{3p^2}$

$= \frac{6p + 3 - p^2 + 5p}{3p^2}$

$= \frac{11p + 3 - p^2}{3p^2}$

52. $\frac{pr+s}{p^2-q^2} - \frac{qr-s}{q^2-p^2}$

$= \frac{pr+s}{p^2-q^2} + \frac{qr-s}{p^2-q^2}$

$= \frac{pr+s+qr-s}{p^2-q^2}$

$= \frac{r(p+q)}{(p-q)(p+q)}$

$= \frac{r}{p-q}$

53. $\frac{x^2-2x+1}{(x-1)^3} \times \frac{x^2-1}{2x+2}$

$= \frac{(x-1)(x-1)}{(x-1)^3} \times \frac{(x-1)(x+1)}{2(x+1)}$

$= \frac{1}{2}$

54. $\frac{a^2-3a-18}{6a-a^2} \div \frac{6a^2+18a}{(-2a)^2}$

$= \frac{(a-6)(a+3)}{a(6-a)} \times \frac{(-2a)(-2a)}{6a(a+3)}$

$= \frac{a-6}{-(a-6)} \times \frac{-2}{6}$

$= \frac{1}{3}$

55. $\frac{y-1}{y^2-4} \times \frac{(y+2)^2}{y^2+y-2} \div \frac{2y}{y^2-2y}$

$= \frac{y-1}{(y-2)(y+2)} \times \frac{(y+2)^2}{(y+2)(y-1)} \times \frac{y(y-2)}{2y}$

$= \frac{1}{2}$

56. $\frac{x^2-8x+15}{3(x-5)^2} \times \frac{3x^2-15x}{3x-1} \div \frac{x-3}{2}$

$= \frac{(x-5)(x-3)}{3(x-5)^2} \times \frac{3x(x-5)}{3x-1} \times \frac{2}{x-3}$

$= \frac{2x}{3x-1}$

57. $\frac{p^2-4p}{6p^2-4p^3} \div \frac{p^2-9p+20}{4p^2-9} \times \frac{3p^2-15p}{6p+9}$

$= \frac{p(p-4)}{2p^2(3-2p)} \times \frac{(2p+3)(2p-3)}{(p-5)(p-4)} \times \frac{3p(p-5)}{3(2p+3)}$

$= \frac{2p-3}{-2(2p-3)}$

58. $\frac{x^2-xy}{xy} + \frac{yz-z^2}{yz}$

$= \frac{z(x^2-xy) + x(yz-z^2)}{xyz}$

$= \frac{xz(x-y) + xz(y-z)}{xyz}$

$x-z$

59. $5x + 2 = 5 - 2x - 1$

$5x + 2x = 5 - 1 - 2$

$3x = 2$

$x = 2/3$

60. $13 - 3y = 1 + 3y$

$13 - 1 = 3y + 3y$

$12 = 6y$

$2 = y$

61. $p(3p - 1) + (3 - p) = (3p + 1)(p - 3)$

$3p^2 - p + 3 - p = 3p^2 - 9p + p - 3$

$-2p + 3 = -8p - 3$

$6p = -6$

$p = -1$

62. $3(x + 1) + 5x = -1 + 5(x - 1$

$3x + 3 + 5x = -1 + 5x - 5$

$8x - 5x = -6 - 3$

$3x = -9$

$x = -3$

63. $2(x - 2)(x - 3) = 4 + 2x(x - 1) - 4x$

$2(x^2 - 3x - 2x + 6) = 4 + 2x^2 - 2x - 4x$

$2x^2 - 10x + 12 = 4 + 2x^2 - 6x$

$-10x + 6x = 4 - 12$

$-4x = -8$

$x = 2$

64. $5t - 22 = t - 2$

$5t - t = -2 + 22$

$4t = 20$

$t = 5$

65. $2(2y + 9) - 2(y + 3) = y + 16 - 5(4 - y)$

$4y + 18 - 2y - 6 = y + 16 - 20 + 5y$

$2y + 12 = 6y - 4$

$-4y = -16$

$y = 4$

66. $(x - 3)^2 - (x - 1)(x + 5) = 4$

$x^2 - 6x + 9 - (x^2 + 4x - 5) = 4$

$x^2 - 6x + 9 - x^2 - 4x + 5 = 4$

$-10x = 4 - 14$

$-10x = -10$

$x = 1$

67. $\frac{x}{3} - \frac{3x - 6}{6} = \frac{x - 6}{2} - 2$

LCD = 6

$\frac{2x}{6} - \frac{3x - 6}{6} = \frac{3(x - 6)}{6} - 2(6)$

$2x - (3x - 6) = 3x - 18 - 12$

$-x + 6 = 3x - 30$

$-4x = -36$

68. $\frac{3(x + 1)}{10} - \frac{x - 2}{5} = 1$

LCD = 10

$3(x + 1) - 2(x - 2) = 10$

$3x + 3 - 2x + 4 = 10$

$x + 7 = 10$

$x = 3$

69. $\frac{5}{t} + 5 = \frac{11}{t} + 7$ (LCD = t)

$5 + 5t = 11 + 7t$

$5t - 7t = 11 - 5$

$-2t = 6$

$t = -3$

70. $\frac{1}{3} + \frac{x+5}{x} - 1 = 0$ (LCD = 3x)

$x + 3(x+5) - 3x(1)$

$x + 3x + 15 - 3x =$

$x = -15$

71. $\frac{7}{2x} + \frac{3}{4} = -\frac{5x-10}{4x} + 3$ (LCD = 4x)

$7(2) + 3(x) = -(5x-10) + 3(4x)$

$14 + 3x = -5x + 10 + 12x$

$3x + 5x - 12x = 10 - 14$

$-4x = -4$

$x = 1$

72. $\frac{1}{2y} = \frac{y-2}{y} + \frac{1}{4}$ (LCD = 4y)

$1(2) = 4(y-2) + 1(y$

$2 = 4y - 8 + y$

$10 = 5y$

$2 = y$

73. $3x(2x - 1) = 0$

$3x = 0$ or $2x - 1 = 0$

$\therefore x = 0$ $x = \frac{1}{2}$

74. $(p-7)(2p+3) = 0$

$p - 7 = 0$ or $2p + 3 = 0$

$p = 7$ $p = -\frac{3}{2}$

75. $x^2 + 4x = 0$

$x(x + 4) = 0$

$x = 0$ or $x + 4 = 0$

$x = -4$

76. $x^2 + 5x + 6 = 0$

$(x + 3)(x + 2) = 0$

$x + 3 = 0$ or $x + 2 = 0$

$x = -3$ $x = -2$

77. $y^2 - 3y - 40 = 0$

$(y - 8)(y + 5) = 0$

$y - 8 = 0$ or $y + 5 = 0$

$y = 8$ $y = -5$

78. $x^2 - 2x - 8 = 0$

$(x - 4)(x + 2) = 0$

$x - 4 = 0$ or $x + 2 = 0$

$x = 4$ $x = -2$

79. $6a(a^2 - 36) = 0$

$6a = 0$ or $a^2 - 36 = 0$

$a = 0$ $(a+6)(a-6) = 0$

$a + 6 = 0$ or $a - 6 = 0$

$a = -6$ $a = 6$

80. $3x^3 - 21x^2 + 36x = 0$

$3x(x^2 - 7x + 12) = 0$

$3x(x - 3)(x - 4) = 0$

$\therefore 3x = 0$ or $x - 3 = 0$ or $x - 4 =$

$x = 0$ $x = 3$ $x = 4$

81.

	Father	Son
Now:	$7x$	x
In 5yrs:	$7x+5$	$x+5$

$$7x+5 = 4(x+5)$$
$$7x+5 = 4x+20$$
$$3x = 15$$
$$x = 5$$

∴ Father = 35yrs now Son = 5yrs now

82.

	Josh	Malik
now	$4x$	x
later	$4x-8$	$x+8$

$$4x-8 = 2(x+8)$$
$$4x-8 = 2x+16$$
$$2x = 24$$
$$x = 12$$

Josh now = 48 marbles Malik now = 12 marbles

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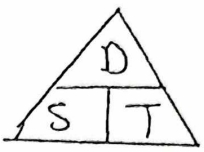
83. x $x+1$ $x+2$ ← [consecutive numbers]

$$3(x+(x+1)) - 2((x+1)+(x+2)) = 13$$
$$3(2x+1) - 2(2x+3) = 13$$
$$6x+3 - 4x - 6 = 13$$
$$2x - 3 = 13$$
$$2x = 16$$
$$x = 8$$

∴ numbers are 8 & 9 and 10

4. | | Dist. | Speed | Time |
|---|---|---|---|
| 1st part of trip | | x | 4hrs |
| 2nd part of trip | | $x+20$ | 2hrs |
| | 520km | | 6hrs |



I filled the Dista in this t so you c see that first I on put the Speed & Tin in.

$\therefore$

	Dist	Speed	Time
1st part of trip	$4x$	x	4
2nd part of trip	$2(x+20)$	$x+20$	2
	520km		6

$\therefore \quad 4x + 2(x+20) = 520\text{km}$

$4x + 2x + 40 = 520$

$6x = 480$

$x = 80 \text{ km/hour}$

$\therefore$ original speed $= 80\text{km/hour}$