2. Algebraic expressions

1.	$\frac{3Z-12}{3-(1+z)} = \frac{3(Z^2-4)}{3-1-Z}$ $= \frac{3(Z-2)(Z+2)}{2-Z}$ $= \frac{3(Z-2)(Z+2)}{-1(Z-2)}$ $= -3(Z+2)$	M1 M1 A1	
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2. *Let the daughter's age 5yrs ago be x*
Mother 4x
come;
Daughter = x + 9
Mother = 4x+ 9
4x + 9 = $^5/_2$ (x +9)
4x + 9 = 2.5x + 22.5
1.5x = 13.5
x = 9
Mother = 41yrs
14 + 41 =55

3. *B.P = 160 x 50 = 24000*
S.P = $\frac{((160 \times 8) - (20 + 12))}{8} \times 180$
= 28080
Profit = 28080 – 24000 = Shs.4080

4. *a) 6a + 7a – 2b – 4b + 2*
= 13a – 6b + 2

b) $\frac{2x-2}{2x} - \frac{3x+2}{4x} = \frac{2(2x-2)-(3x+2)}{4x}$
= $\frac{4x-3x-4-2}{4x}$
= $\frac{x-6}{4x}$

5. *$6u^2y^2 + 13uy - 5 = (2uy + 5)(3xy - 1)$*
$3u^2y^2 - 13uy + X = (uy - 4)(3xy - 1)$
$\frac{(2xy+5)}{(uy-4)} \quad \frac{(3xy-1)}{(3xy-1)}$

= $\frac{2xy+5}{Uy-4}$

6. *a) From x + y and $x^2 = y^2 = 34$*

$X = 8 - y$

Substituting for x in $x^2 - y^2 = 34$

$(8 - y)(8 - y) + y^2 = 34$

$64 - 8y - 8y + y^2 + y^2 = 34$

$64 - 16y + 2y^2 = 34$

$2y^2 - 16y + 64 - 34 = 0$

$2y^2 - 16y + 30 = 0$

$y^2 = 8y + 15 = 0$

$y(y - 3) - 5(y-3) = 0 \quad (y-5)(y - 3)$

y is either 5 or 3

but $x - y = 8$

x is either 5 0r 3

$\therefore x^2 + 2xy + y^2 = 32 + 2 \times 3 \times 5 + 25$

$= 9 + 30 + 25 = 64$

b) $2xy = 2 \times 3 \times 5 = 30$

c) $x^2 - 2xy + y^2 = 9 - 2 \times 3 \times 5 + 25 = 4$

d) $x = y = 8$ and $x^2 + y^2 = 34$

$x = 8 - y$

$(8 - y)^2 + y^2 = 34$

$y^2 - 8y + 15 = 0$

$y^2 - 3y - 5y + 15 = 0$

$y(y -3) - 5(y - 3)$

$(y-3) = o \quad y = 3$

$(y-5) = 0 \quad y = 5$

$x + 3 = 8$, $x = 5$ or $x + 5 = 8$

$x = 3$

$\therefore x$ is either 3 or 5

y is either 3 0r 5

7. $\dfrac{6x^2 + 35x - 6}{2x^2 - 72}$

$= \dfrac{6x(x - + 6) - 1(x + 6)}{2(x^2 - 36)}$

$= \dfrac{(6x - 1)(x + 6)}{2(x - 6)(x + 6)}$

$= \dfrac{6x - 1}{2(x - 6)}$

8. $^2/_5 (3x - 2) - ¾ (2x - 2)$

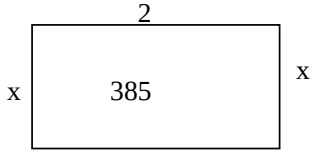
$= \dfrac{8(3x-2) - 9(2x-2)}{12}$

$= 24x - 16 - 18x + 18$

$= \dfrac{6x + 2}{12}$

$= \dfrac{2(3x + 1)}{12}$

$= \dfrac{3x + 1}{6}$



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9. *Numerator:*
$4y^2 - x^2 = (2y + x)(2y - x)$
Denominator :
$2x^2 + 4yx + 3yx - 6y^2$
$= (2x^2 - 4yx) + (3yx - 6y2)$
$= 2x(x-2y) + 3y(x-2y)$
$= (2xx+3y)(x-2y)$
Combining : $(2y + x)(2y-x)$
$(2x+3y)(x-2y)$
$-\frac{2x + 3y}{2y + x}$ *or* $\frac{-2x - 3y}{2y + x}$

10. $\frac{3(x + y) - (x - y)}{X^2 - y^2}$
$= \frac{3x + 3y - x + y}{x^2 - y^2}$
$= \frac{2(x + 2y)}{x^2 - y^2}$

11. $x^2 + 2x - 5 = 3x + 1$
$x^2 - x - 6 - 6 = 0$
$(x+2)(x-3) = 0$
$x = -2$ *or* $x = 3$
When $x = -2$, $y = 3x - 2 + 1 = -5$ *Point (-2, -5)*
When $x = 3$, $y = 3x \times 3 + 1 = 10$ *Point (3, 10)*

12. *(a)* $\frac{y(y + 2)}{y(y^2 - y - 60}$
$\frac{y(y+2)}{y(y^2 - y-6)} = \frac{y + 2}{(y+2)(y-3)}$

(b) $\frac{y + 2}{(y + 2)(y-3)} = \frac{1}{4}$
$4y + 8 = y^2 - y - 6$
$y^2 - 5y - 14 = 0$
$(y-7)(y+2) = 0$
$y = 7$
$y = -2$

13. $\frac{104.6}{2.4} = 44 \times 2$
$\frac{63.9}{2.4} = 26 \times 2$
$= 88 + 54 = 142$

14. $3(25x^2 - 9y^2)$
$3(5x + 3y)(5x - 3y)$

15. *i)* $d = 8.4$ $r = \frac{1}{2}$
6^{th} *jump* $= 8(\frac{1}{2})^{6-1}$

PSE

$^{8.4}/_{32}$

$= 0.2625 = 0.26cm$

ii) $56 = \frac{9.4\ (1 - (\frac{1}{2})\ 6}{1 - \frac{1}{2}}$

$= \frac{8.4 \times 63 \times 2}{64}$

$= 16.54\ cm$

16. Factorizing the numerator

$= p(p^2 - q^2) + q(p^2 - q)$

$= (p+q)(p^2 - q^2)$

$= (p+q)(p+q)\ n(p-q)$

Factorising the denominator

$(p+q)(p+q)$

$\frac{\text{Numerator}}{\text{Denominator}} = p - q$

17. $\frac{(3x + 2y)(3x - 2y)}{(3x + 2y)(3x - 2y)}$

$\frac{3x + 2y}{4x + 3y}$

18. $(x - 3)(AX^2 + BX + C) = x^3 - 7x - 6$

$AX^3 + BX^2 + CX - 3AX^2 - 3BX - 3c = x^3 - 7x - 6$

$A = 1$

$B - 3A = 0$

$B - 3 \times 1 = 0$

$B = 3$

$-3c = -6$

$c = 2$

19. a) $8(2^2)^y = 6 \times 2^y - 1$

let $t = 2^y$

$8t^2 = 6t - 1$

$8t^2 - 4t - 2t + 1 = 0$

$(4t - 1)(2t - 1) = 0$

$t = ¼$ or $½$

$\therefore t = 2^y = ¼ = 2^{-2}$

$\therefore y = -2$

0r $t = 2^y = ½ = 2^{-1}$

$\therefore y = -1$

$\therefore y = -2$ 0r -1

b) Numerator $= 2x^2 - 98$

$= 2(x^2 - 49)$

$= 2(x + 7)(x - 7)$

Denominator $= 3x^2 - 16x - 35$

$= 3x^2 - 21x + 5x - 35$

$= 3x(x - 7) + 5(x - 7)$

$= (x - 7)(3x + 5)$

$\therefore \frac{2x^2 - 98}{3x^2 - 16x - 3} \div \frac{x + 7}{3x + 5} = \frac{2(x + 7)(x - 7)}{(3x + 5)(x - 7)} \times \frac{(3x + 5)}{(x + 7)}$

$= 2$

20. $\frac{(2x - y)(2x + y)}{(x - 3y)(2x - y)} \checkmark \checkmark$

$\frac{2x + y}{x - 3y} \checkmark$

21. $P^2 - 2pq + q^2 = (p-q)^2$

$P^3 - pq^2 + p^2q - q^3$

$= p(p^2-q^2) + q(p^2 - q^2)$

$= (p+ q)(p^2-q^2)$

$\frac{(p - q)^2}{(p+ q)(P^2 - q^2)} = \frac{(p - q)^2}{(p+q)^2 (p-q)} \checkmark$

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

22. *Let the numbers be a and b*

$a + b = 15 - x3$

$5a - 3b = 19 \times 1$

$3a + 3b = 45$

$5a - 3b = 19$

$8a = 64$

$a = 8$

$b = 7$

23. $\frac{3(2x-5) - 4(1-x) - 6(x-4)}{12}$

$\frac{6x - 15 - 4 + 4x - 6x + 24}{12}$

$\frac{4x - 5}{12}$

24. $\frac{3a^2 + 4ab + b^2}{4a^2 + 3ab - b^2} = \frac{3a^2 + 3ab + ab + b^2}{4a^2 + 4ab - ab - b^2}$

$= \frac{3a(a+b) + b(a+b)}{4a(a+b) - b(a+b)}$

$= \frac{(3a+b)(a+b)}{(a+b)(4a-b)}$

$= \frac{3a + b}{4a - b}$