

$$15. 30m + 12n \\ - (2m + 2n) \\ 28m + 10n$$

Ex 1

$$x=4$$

$$1. 2(4) + 2 \\ = 8 + 2 \\ = 10$$

$$4. 4 + 3(3) \\ = 4 + 9 \\ = 13$$

$$7. 5(4) - 3(2) \\ = 20 - 6 \\ = 14$$

$$10. 6(4) - 8(3) \\ = 24 - 24 \\ = 0$$

$$13. 2(4) + 5(2) - 4(3) \\ = 8 + 10 - 12 \\ = 6$$

$$16. 2 + 3 - 4 \\ = 1$$

$$19. 3 - 2 + 4 \\ = 5$$

Algebraic Substitution

$$y=2 \quad z=3$$

$$2. 3(2) + 2(3) \\ = 6 + 6 \\ = 12$$

$$5. 4 + 2 + 3 \\ = 9$$

$$8. 6(2) - 2(3) \\ = 12 - 6 \\ = 6$$

$$11. 4 + 2 - 3 \\ = 3$$

$$14. 3(4) - 2 - 3 \\ = 12 - 2 - 3 \\ = 7$$

$$17. 4(4) + 2 - 6(3) \\ = 16 + 2 - 18 \\ = 0$$

$$20. 8(3) - 4(2) - 2(4) \\ = 24 - 8 - 8 \\ = 8$$

$$3. 5(4) + 3 \\ = 20 + 3 \\ = 23$$

$$6. 4 + 3(2) + 2(3) \\ = 4 + 6 + 6 \\ = 16$$

$$9. 3(4) - 6(2) \\ = 12 - 12 \\ = 0$$

$$12. 4 + 3(2) - 2(3) \\ = 4 + 6 - 6 \\ = 4$$

$$15. 4(2) + 3 - 2(4) \\ = 8 + 3 - 8 \\ = 3$$

$$18. 5(3) - 5(2) - 4 \\ = 15 - 10 - 4 \\ = 1$$

$$21. 2(4) + 3(2) - 4(2) \\ = 8 + 6 - 8 \\ = 6$$

Ex 2

$$a=3$$

$$b=2$$

$$c=5$$

$$1. 2(3)(5) \\ = 30$$

$$2. 3(2)(5) \\ = 30$$

$$3. 4(3)(2) \\ = 24$$

$$4. (3)(2)(5) \\ = 30$$

$$5. 3(3)(2)(5) \\ = 90$$

$$6. 3(3)(2) + 2(2)(5) \\ = 18 + 20 \\ = 38$$

$$7. 4(2)(5) + 2(3)(2) \\ = 40 + 12 \\ = 52$$

$$8. 2(3)(2) - 1(2)(5) \\ = 12 - 10 \\ = 2$$

$$9. 4(3)(5) - 2(2)(5) \\ = 60 - 20 \\ = 40$$

$$10. 3(3)(2) + (3)(5) \\ = 18 + 15 \\ = 33$$

$$11. ~~4(3)(2)~~ 4(3) + (2)(5) \\ = 12 + 10 \\ = 22$$

$$12. 5(2) - 3(3) \\ = 10 - 9 \\ = 1$$

$$13. 5(3) - 3(5) \\ = 15 - 15 \\ = 0$$

$$14. 3(3)(2) + 4(2)(5) \\ = 18 + 40 \\ = 58$$

$$15. 6(2)(5) - 3(3)(2) \\ = 60 - 18 \\ = 42$$

$$16. 3(3)(5) + 2 \\ = 45 + 2 \\ = 47$$

$$17. 3 + 5(3)(5) \\ = 3 + 75 \\ = 78$$

$$18. (3)(2)(5) - 6(2) \\ = 30 - 12 \\ = 18$$

$5b - 5a - 2a$
 $= 5b - 7a$
 $+ 5a - 5a$
 $= 5b - 2a$

$x=1$ $y=3$ $z=4$

19. $4(1)(3)$
 $= 12$

20. $2(3)(4)$
 $= 24$

21. $5(1)(4)$
 $= 20$

22. $(1)(3)(4)$
 $= 12$

23. $2(1)(3) + 3(3)(4)$
 $= 6 + 36$
 $= 42$

24. $5(1)(4) + 4(1)(3)$
 $= 20 + 12$
 $= 32$

25. $4(3)(4) - 8(1)(3)$
 $= 48 - 24$
 $= 24$

26. $5(1)(4) - 2(1)(3)$
 $= 20 - 6$
 $= 14$

27. $6(1) + 5(3) - 2(4)$
 $= 6 + 15 - 8$
 $= 13$

28. $13(4) - 6(1)$
 $= 52 - 6$
 $= 46$

29. $3(1)(3) + 2(3)(4) - 5(1)(4)$
 $= 9 + 24 - 20$
 $= 13$

30. $6(3) + (1)(3)(4)$
 $= 18 + 12$
 $= 30$

$p=2$ $q=1$ $r=3$

31. $3(2)(2(1)+3)$
 $= 6(2+3)$
 $= 6(5)$
 $= 30$

32. $5(1)(3(2)-3)$
 $= 5(6-3)$
 $= 5(3)$
 $= 15$

33. $2(3)(2+4(1))$
 $= 6(2+4)$
 $= 6(6)$
 $= 36$

34. $3(2(2)+3(1))$
 $= 3(4+3)$
 $= 3(7)$
 $= 21$

35. $4(1)(4(3)-3(2))$
 $= 4(12-6)$
 $= 4(6)$
 $= 24$

36. $3(3)(4(2)-8(1))$
 $= 9(8-8)$
 $= 9(0)$
 $= 0$

$$21s + 8u$$

$$4s + 3t + 2z - 2s$$

$$17 = 8x + 4y + 2z$$

$$= 8x + 4y$$

$$19 = 6m + 12n - 12m - 6m$$

$$-25b + 5a$$

$$\begin{aligned} 37. & 2(2)(3) + 3(1)(2+3) \\ &= 12 + 3(5) \\ &= 12 + 15 \\ &= 27 \end{aligned}$$

$$\begin{aligned} 38. & 3(1)(3) + 2(2(1)+3) \\ &= 9 + 2(2+3) \\ &= 9 + 2(5) \\ &= 9 + 10 \\ &= 19 \end{aligned}$$

$$\begin{aligned} 39. & 2(3)(2-1) + (2)(1) \\ &= 6(1) + 2 \\ &= 6 + 2 \\ &= 8 \end{aligned}$$

$$\begin{aligned} 40. & 4(1)(3(3)-2) - 2(1)(1) \\ &= 4(9-2) - 6 \\ &= 4(7) - 6 \\ &= 28 - 6 \\ &= 22 \end{aligned}$$

Progressing onto NS - Algebra

f x 3

1) a) $C = 3L + 2H$

$$= 3(50) + 2(20)$$

$$= 150 + 40$$

$$= 190$$

b) $C = 3L + 2H$

$$= 3(30) + 2(25)$$

$$= 90 + 50$$

$$= 140$$

c) $C = 3L + 2H$

$$= 3(80) + 2(50)$$

$$= 240 + 100$$

$$= 340$$

2) a) $T = 12U + 2D$

$$= 12(2) + 2(5)$$

$$= 24 + 10$$

$$= 34$$

b) $T = 12U + 2D$

$$= 12(4) + 2(8)$$

$$= 72 + 16$$

$$= 88$$

c) $T = 12U + 2D$

$$= 12(3) + 2(12)$$

$$= 36 + 24$$

$$= 60$$

3) a) $n = 5A - 3L$

$$= 5(20) - 3(15)$$

$$= 100 - 45$$

$$= 55$$

b) $n = 5A - 3L$

$$= 5(100) - 3(50)$$

$$= 500 - 150$$

$$= 350$$

c) $n = 5A - 3L$

$$= 5(200) - 3(50)$$

$$= 1000 - 150$$

$$= 850$$

4) a) $T = 2p + 15h$

$$= 2(6) + 15(2)$$

$$= 12 + 30$$

$$= 42$$

b) $T = 2p + 15h$

$$= 2(8) + 15(1)$$

$$= 16 + 15$$

$$= 31$$

c) $T = 2p + 15h$

$$= 2(10) + 15(4)$$

$$= 20 + 60$$

$$= 80$$

5) a) $C = 70 + 5n$

$$= 70 + 5(2)$$

$$= 80$$

b) $C = 70 + 5n$

$$= 70 + 5(6)$$

$$= 100$$

c) $C = 70 + 5n$

$$= 70 + 5(6)$$

$$= 170$$

Progressing onto NS - Algebra

(2)

Ex 3 cont'd

$$\begin{aligned} 6) \text{ a) } T &= 12w + 5B \\ &= 12(4) + 5(8) \\ &= 48 + 40 \\ &= 88 \end{aligned}$$

$$\begin{aligned} \text{b) } T &= 12w + 5B \\ &= 12(3) + 5(12) \\ &= 36 + 60 \\ &= 96 \end{aligned}$$

$$\begin{aligned} \text{c) } T &= 12w + 5B \\ &= 12(2\frac{1}{2}) + 5(7) \\ &= 30 + 35 \\ &= 65 \end{aligned}$$

$$\begin{aligned} 7) \text{ a) } n &= 4B + 3G \\ &= 4(12) + 3(5) \\ &= 48 + 15 \\ &= 63 \end{aligned}$$

$$\begin{aligned} \text{b) } n &= 4B + 3G \\ &= 4(7) + 3(12) \\ &= 28 + 36 \\ &= 64 \end{aligned}$$

$$\begin{aligned} \text{c) } n &= 4B + 3G \\ &= 4(11) + 3(6) \\ &= 44 + 18 \\ &= 62 \end{aligned}$$

$$\begin{aligned} 8) \text{ a) } C &= 2(3e + 2b) \\ &= 2(3(20) + 2(6)) \\ &= 2(60 + 12) \\ &= 2(72) \\ &= 144 \end{aligned}$$

$$\begin{aligned} \text{b) } C &= 2(3e + 2b) \\ &= 2(3(12) + 2(15)) \\ &= 2(36 + 30) \\ &= 2(66) \\ &= 132 \end{aligned}$$

$$\begin{aligned} \text{c) } C &= 2(3e + 2b) \\ &= 2(3(15) + 2(20)) \\ &= 2(45 + 40) \\ &= 2(85) \\ &= 170 \end{aligned}$$

$$\begin{aligned} 9) \text{ a) } E &= 2(4S + 2H) \\ &= 2(4(5) + 2(2)) \\ &= 2(20 + 4) \\ &= 2(24) \\ &= 48 \end{aligned}$$

$$\begin{aligned} \text{b) } E &= 2(4S + 2H) \\ &= 2(4(10) + 2(5)) \\ &= 2(40 + 10) \\ &= 2(50) \\ &= 100 \end{aligned}$$

$$\begin{aligned} \text{c) } E &= 2(4S + 2H) \\ &= 2(4(8) + 2(4)) \\ &= 2(32 + 8) \\ &= 2(40) \\ &= 80 \end{aligned}$$

Progressing Onto NS - Algebra

Ex 3 contd.

$$\begin{array}{lll} 10) a) P = 2(25A + 15C) & b) P = 2(25A + 15C) & c) P = 2(25A + 15C) \\ = 2(25(6) + 15(6)) & = 2(25(10) + 15(10)) & = 2(25(12) + 15(8)) \\ = 2(150 + 90) & = 2(250 + 150) & = 2(300 + 120) \\ = 2(240) & = 2(400) & = 2(420) \\ = 480 & = 800 & = 840 \end{array}$$

$$\begin{array}{lll} 11) a) I = 8(12T + 7D) & b) I = 8(12T + 7D) & c) I = 8(12T + 7D) \\ = 2(12(3) + 7(6)) & = 5(12(5) + 7(3)) & = 10(12(6) + 7(5)) \\ = 2(36 + 42) & = 5(60 + 21) & = 10(72 + 35) \\ = 2(78) & = 5(81) & = 10(107) \\ = 156 & = 405 & = 1070 \end{array}$$

$$\begin{array}{lll} 12) a) I = 4(12C + 2W) & b) I = 4(12C + 2W) & c) I = 4(12C + 2W) \\ = 4(12(5) + 2(2)) & = 8(12(6) + 2(3)) & = 12(12(3) + 2(6)) \\ = 4(60 + 4) & = 8(72 + 6) & = 12(36 + 8) \\ = 4(64) & = 8(78) & = 12(44) \\ = 256 & = 624 & = 528 \end{array}$$

$$\begin{array}{lll} 13) a) R = \frac{PQ}{P+Q} & b) R = \frac{PQ}{P+Q} & c) R = \frac{PQ}{P+Q} \\ = \frac{(5)(5)}{5+5} & = \frac{(7)(3)}{7+3} & = \frac{(9)(3)}{9+3} \\ = \frac{25}{10} & = \frac{21}{10} & = \frac{27}{12} \\ = 2.5 & = 2.1 & = \frac{9}{4} \text{ or } 2.25 \end{array}$$

Progressing onto NS-Algebra.

5

Ex4 Contd $a=4$ $b=3$ $c=2$

$$\begin{aligned} 10) x &= ab - c \\ &= 4(3) - 2 \\ &= 12 - 2 \\ &= 10 \end{aligned}$$

$$\begin{aligned} 11) x &= ab + ac \\ &= 4(3) + 4(2) \\ &= 12 + 8 \\ &= 20 \end{aligned}$$

$$\begin{aligned} 12) x &= 5(bc + a) \\ &= 5(3(2) + 4) \\ &= 5(6 + 4) \\ &= 5(10) \\ &= 50 \end{aligned}$$

$$\begin{aligned} 13) x &= 2(ab - c) \\ &= 2(4(3) - 2) \\ &= 2(12 - 2) \\ &= 2(10) \\ &= 20 \end{aligned}$$

$$\begin{aligned} 14) x &= a(b + c) \\ &= 4(3 + 2) \\ &= 4(5) \\ &= 20 \end{aligned}$$

$$\begin{aligned} 15) x &= b(2a - c) \\ &= 3(2(4) - 2) \\ &= 3(8 - 2) \\ &= 3(6) \\ &= 18 \end{aligned}$$

Ex5 $p=6$ $q=4$ $r=1$

$$\begin{aligned} 1) y &= 2p - q \\ &= 2(6) - 4 \\ &= 12 - 4 \\ &= 8 \end{aligned}$$

$$\begin{aligned} 2) y &= q - 4r \\ &= 4 - 4(1) \\ &= 4 - 4 \\ &= 0 \end{aligned}$$

$$\begin{aligned} 3) y &= p - 2q \\ &= 6 - 2(4) \\ &= 6 - 8 \\ &= -2 \end{aligned}$$

$$\begin{aligned} 4) y &= r - p \\ &= 1 - 6 \\ &= -5 \end{aligned}$$

$$\begin{aligned} 5) y &= q + 2r - p \\ &= 4 + 2(1) - 6 \\ &= 4 + 2 - 6 \\ &= 0 \end{aligned}$$

$$\begin{aligned} 6) y &= 2(q + r) \\ &= 2(4 + 1) \\ &= 2(5) \\ &= 10 \end{aligned}$$

Progressing onto NS - Algebra

Ex 5 contd. $p=6$ $q=4$ $r=1$

7) $y = 3(r - q)$ $= 3(1 - 4)$ $= 3(-3)$ $= -9$	8) $y = q(p + 2r)$ $= 4(6 + 2(1))$ $= 4(8)$ $= 32$	9) $y = p^2 + r$ $= (6)^2 + 1$ $= 36 + 1$ $= 37$
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10) $y = p^2 + q^2$ $= 6^2 + 4^2$ $= 36 + 16$ $= 52$	11) $y = (p + q)^2$ $= (6 + 4)^2$ $= 10^2$ $= 100$	12) $y = 2p^2$ $= 2(6)^2$ $= 2(36)$ $= 72$
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13) $y = (2q)^2$ $= (2 \times 4)^2$ $= 8^2$ $= 64$	14) $y = 3r^2$ $= 3(1)^2$ $= 3(1)$ $= 3$	15) $y = (3r)^2$ $= (3 \times 1)^2$ $= 3^2$ $= 9$
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Ex 6 $x=8$ $y=2$ $z=3$

1) $m = x - y - z$ $= 8 - 2 - 3$ $= 3$	2) $m = xy - z$ $= 8(2) - 3$ $= 16 - 3$ $= 13$	3) $m = xyz$ $= 8(2)(3)$ $= 48$
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4) $m = z - x$ $= 3 - 8$ $= -5$	5) $m = y - x$ $= 2 - 8$ $= -6$	6) $m = y^2 + z^2$ $= 2^2 + 3^2$ $= 4 + 9$ $= 13$
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