ALGEBRAIC SUBSTITUTION

Task 1 – Given that

$a = 5$

$b = 3$

$c = 2$

$d = 1$

$e = 4$

Work out the value of:

1) $a + 4 = 5 + 4 = \mathbf{9}$

2) $9b = 9(3) = \mathbf{27}$

3) $c - 10 = 2 - 10 = \mathbf{-8}$

4) $d + 2 = 1 + 2 = \mathbf{3}$

5) $3e = 3(4) = \mathbf{12}$

6) $a + b + c = 5 + 3 + 2 = \mathbf{10}$

7) $c + d + e = 2 + 1 + 4 = \mathbf{7}$

8) $a - c = 5 - 2 = \mathbf{3}$

9) $10 - d = 10 - 1 = \mathbf{9}$

10) $\frac{20}{a} = \frac{20}{5} = \mathbf{4}$

11) $\frac{e}{5} = \mathbf{\frac{4}{5}}$

12) $\frac{c}{2} = \frac{2}{2} = \mathbf{1}$

13) $a^2 = 5^2 = \mathbf{25}$

14) $b^3 = 3^3 = \mathbf{27}$

15) $\sqrt{e} = \sqrt{4} = \mathbf{2}$

16) $\frac{a}{d} = \frac{5}{1} = \mathbf{5}$

17) $\sqrt{d} + b = \sqrt{1} + 3 = \mathbf{4}$

18) $\frac{ae}{10} = \frac{5\times4}{10} = \frac{20}{10} = \mathbf{2}$

19) $ab + cd = (5 \times 3) + (2 \times 1) = 15 + 2 = \mathbf{17}$

20) $abe \div c = (5 \times 3 \times 4) \div 2 = 60 \div 2 = \mathbf{30}$

Task 2 – Given that

$v = 12$

$w = 10$

$x = 1$

$y = 0.5$

$z = -2$

Work out the value of:

21) $v + 6 = 12 + 6 = \mathbf{18}$

22) $\frac{60y}{5} = \frac{60\times0.5}{5} = \frac{30}{5} = \mathbf{6}$

23) $6y + 3 = 6(0.5) + 3 = \mathbf{6}$

24) $x + y + z = 1 + 0.5 + (-2) = \mathbf{-0.5}$

25) $3z - 9 = 3(-2) - 9 = \mathbf{-15}$

26) $12 - yz = 12 - (0.5 \times -2) = \mathbf{13}$

27) $2w - 5 = 2(10) - 5 = \mathbf{15}$

28) $10y - 9 = 10(0.5) - 9 = \mathbf{-4}$

29) $4x + 1 = 4(1) + 1 = \mathbf{5}$

30) $2v^2 = 2 \times (12)^2 = \mathbf{288}$

31) $(yz)^2 = (0.5 \times -2)^2 = (-1)^2 = \mathbf{1}$

32) $\frac{w}{y} = \frac{10}{0.5} = \mathbf{20}$

33) $\frac{v}{3} + 8 = \frac{12}{3} + 8 = \mathbf{12}$

34) $vw \div z = (12 \times 10) \div (-2) = \mathbf{-60}$

35) $\frac{122-x}{11} = \frac{122-1}{11} = \mathbf{11}$

36) $\frac{w-z}{4} = \frac{10--2}{4} = \mathbf{3}$

37) $(y - z)^3 = (0.5 - -2)^3 = \mathbf{15.625}$

38) $xyz = 1 \times 0.5 \times -2 = \mathbf{-1}$

39) $3(x + 7) = 3(1 + 7) = \mathbf{24}$

40) $2(y - 7) + 10 = 2(0.5 - 7) + 10 = \mathbf{-3}$

Task 3

41) Given that $a = 7b + 4$

Work out the value of a when $b = -2$

$a = 7(-2) + 4$

$= -14 + 4$

$= \mathbf{-10}$

42) Given that $x = 4$ and $y = 8$

Work out the value of $9x + 2y$

$9(4) + 2(8)$

$= 36 + 16$

$= \mathbf{52}$

43) Given that $p = 12 - 3q$

Work out the value of p when $q = 5$

$p = 12 - 3(5)$

$= 12 - 15$

$= \mathbf{-3}$

44) Given that $m = 3n - 10$

Work out the value of m when $n = -4$

$m = 3(-4) - 10$

$= -12 - 10$

$= \mathbf{-22}$

45) Given that $v = u + at$

Work out the value of v when,

$u = 10$

$a = 2$

$t = 5$

$v = 10 + 2(5)$

$= 10 + 10$

$= \mathbf{20}$

46) Given that $l = 4n + 2k$

Work out the value of l when $n = 6$ and $k = -3$

$l = 4(6) + 2(-3)$

$= 24 - 6$

$= \mathbf{18}$

47) Given that $x = 2y - z$

Work out the value of x when,

$y = -9$

$z = -12$

$x = 2(-9) - -12$

$= -18 + 12$

$= \mathbf{-6}$

48) Given that $u = v - 2z$

Work out the value of u when $v = 10$ and $z = -4$

$u = 10 - 2(-4)$

$= 10 + 8$

$= \mathbf{18}$

49) Given that $r = 6(s + 3)$

Work out the value of r when $s = -5$

$r = 6(-5 + 3)$

$= 6(-2)$

$= \mathbf{-12}$

50) Given that $t = \frac{r}{s}$

Work out the value of t when $r = -72$ and $s = \frac{1}{4}$

$t = -\frac{72}{\left(\frac{1}{4}\right)}$

$= \mathbf{-288}$

51) Given that $k = 5m^2 - 1$

Work out the value of k when $m = -6$

$k = 5(-6)^2 - 1$

$= 5(36) - 1$

$= 180 - 1$

$= \mathbf{179}$

52) Given that $c = 2d^3 + 7$

Work out the value of c when $d = 4$

$c = 2(4)^3 + 7$

$= 2(64) + 7$

$= 128 + 7$

$= \mathbf{135}$

53) Given that $y = \frac{3x-2z}{x+z}$

Work out the value of y when $x = 8$ and $z = -2$

$y = \frac{3(8) - 2(-2)}{8 + (-2)}$

$= \frac{24 + 4}{6}$

$= \frac{28}{6}$

$= \mathbf{\frac{14}{3}}$

54) Given that $n = 4p^2 - 6q$

Work out the value of n when $p = -5$ and $q = -3$

$n = 4(-5)^2 - 6(-3)$

$= 4(25) - (-18)$

$= 100 + 18$

$= \mathbf{118}$

55) Given that $w = (a + 2b)^2 - 3ab$

Work out the value of w when $a = -4$ and $b = 7$

$w = \left(-4 + 2(7)\right)^2 - 3(-4)(7)$

$= 10^2 + 84$

$= 100 + 84$

$= \mathbf{184}$

56) Given that $a = \sqrt{bcd}$

Work out the value of a when $b = 3$, $c = 4$ and $d = 12$

$a = \sqrt{3 \times 4 \times 12}$

$= \sqrt{144}$

$= \mathbf{12}$

57) Given that $d = \frac{2e-10}{f^2 - \sqrt[3]{g}}$

Work out the value of d when,

$e = 13$

$f = 12$

$g = 8$

Give your answer as a fraction in simplest form.

$d = \frac{2(13) - 10}{12^2 - \sqrt[3]{8}}$

$= \frac{26 - 10}{144 - 2}$

$= \frac{16}{142}$

$= \mathbf{\frac{8}{71}}$