

10.2 ALGEBRAIC CALCULATIONS (SUBSTITUTION)

The variables we use in algebra are only replacements for numbers. In this chapter we will use the order of operations rules (BEDMAS), to calculate the standard form or numerical value of an expression when we are given the value of each variable.

EXAMPLE: Calculate the value of each expression by substituting for the variables in each.

1. $3x^2 - 5y = ?$, if $x = 2$, $y = -3$

$$3(2)^2 - 5(-3)$$

$$3(4) - 5(-3)$$

$$12 + 15 = 27$$

2. $7a^3 - 3b^2 = ?$, if $a = -2$, $b = -3$

$$7(-2)^3 - 3(-3)^2$$

$$7(-8) - 3(9)$$

$$-56 - 27 = -83$$

A. Calculate the numerical value of each expression by substituting each variable with the appropriate number.

1. $x^2 - y^2$, if $x = 2$, $y = 3$

$$-5$$

2. $4a^2 + 4ab - b^2$, if $a = 2$, $b = 3$

$$31$$

3. $(a - b)^3$, if $a = 3$, $b = 1$

$$8$$

4. $(3x)^3$, if $x = -1$

$$-27$$

5. $\frac{x}{2} + \frac{x}{3} + \frac{x}{4}$, if $x = 1$

$$1\frac{1}{12} = 1.08$$

6. $a(b + c) + (ac)$, if $a = 2$, $b = 3$, $c = 4$

$$1.75$$

7. $5x^2 - 6y^3$, if $x = -2$, $y = -3$

$$182$$

8. $2x^3 - 3x^2 - 4x$, if $x = -3$

$$-69$$

9. $(a + b)^2(a - b)$, if $a = 2$, $b = 1$

9

10. $1 + (3 - t)$, if $t = -3$

0.17

11. $(x + y)(x - y)^2$, if $x = 2$, $y = 1$

3

12. $3x^2 + 5x + 9$, if $x = -2$

11

13. $a^3 - b^2 - 2c$, if $a = -1$, $b = -2$, $c = -3$

1

14. $3a^2 - ab - bc$, if $a = 1$, $b = 2$, $c = 3$

-5

15. $x^2 - y^2$, if $x = 2$, $y = 1$

3

16. $(2m^2 - 4m + 3) \div (7 - m)$, if $m = -1$

1.13

17. $-y^2 - 5y$, if $y = 0.5$

-2.25

18. $4t^5 - 3t^2 + t + 2$, if $t = -0.5$

0.625

19. $a^3 - 3a^2 - 4$, if $a = -3$

-58

20. $-2b^2 + b$, if $b = 4$

-28