Work Sheet- 5 for Class-Ten(18.08.2020), Chapter- Three Algebraic Expression

Exercise- 3.2

Algebraic Expression

Creative Multiplication Choice Questions

1. **If x + y = 3 and xy = 1 then what is the value of $x^3 + y^3 + (x - y)^2$?[R.B.- 20]**

a) 23 b) 31
c) 41 d) 49

2. **If $a^2 + 1 - \sqrt{6}a = 0$ then what is the value of $a^3 + \frac{1}{a^3}$? [J.B.- 20]**

a) 0 b) $3\sqrt{3}$
c) $3\sqrt{6}$ d) $5\sqrt{6}$

Answer to the questions No. (3 – 4) using following information:

$x^2 - \sqrt{3}x + 1 = 0$

3. **$x + \frac{1}{x}$ = What? [S.B.- 20]**

a) $-\sqrt{3}$ b) -3
c) $\sqrt{3}$ d) 3

4. **What is the value of $x^3 + \frac{1}{x^3}$?[S.B.- 20]**

a) 0 b) $3\sqrt{3}$
c) $6\sqrt{3}$ d) $9\sqrt{3}$

5. **If $x + \frac{1}{x} = \sqrt{5}$ then – [C.B.- 20]**

i. $x^2 - \sqrt{5}x + 1 = 0$
ii. $x - \frac{1}{x} = 1$
iii. $x^2 + \frac{1}{x^2} = 5$

Which of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

6. **If $(x + y)^2 = \sqrt[3]{27}$ and xy = 0 then – [B.B.- 20]**

i. $x^2 + y^2 = 3$
ii. $x - y = \sqrt{3}$
iii. $x^3 + y^3 = 3\sqrt{3}$

Which of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

7. **If $a + \frac{1}{a} = 5$ then what is the value of $a^3 + \frac{1}{a^3}$? [J.B.- 19]**

a) 21 b) 23
c) 110 d) 140

8. **If $a + \frac{1}{a} = 2$ and $a > 0$ then - [B.B.- 19]**

i. $a^2 + \frac{1}{a^2} = 2$
ii. $a^3 - \frac{1}{a^3} = 0$
iii. $a^4 + \frac{1}{a^4} = 4$

Which of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

Answer to the questions No. (9 – 10) from the following expressions:

$p + \frac{1}{p} = \sqrt{6}$.

9. **What is the value of $p^2 + \frac{1}{p^2}$? [Dj.B.- 19]**

a) 2 b) 4
c) 8 d) 10

10. **What is the value of $p^3 + \frac{1}{p^3}$? [Dj.B.- 19]**

a) $9\sqrt{6}$ b) $8\sqrt{6}$
c) $4\sqrt{6}$ d) $3\sqrt{6}$

Answer to the questions No. (11 - 12) using the following information:

$x + \frac{1}{x} = 2\sqrt{2}$.

11. **What is the value of $x^2 + \frac{1}{x^2}$? [S.B.- 19]**

a) 4 b) 6
c) 8 d) 10

12. **What is the value of $x^3 + \frac{1}{x^3}$? [S.B.- l9]**

a) $22\sqrt{2}$ b) $16\sqrt{2}$
c) $14\sqrt{2}$ d) $10\sqrt{2}$

13. **If $a - b = 2$ and $ab = 3$ then What is the value of $a^3 - b^3$ = What? [C.B.- 17]**

a) -10 b) -1
c) 17 d) 26

14. **If $p + q = r$ then - [S.B.- 17]**

i. $p^3 + q^3 = r^3 - 3pqr$
ii. $(p - q)^2 = r^2 - 4pq$

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iii. $\{(p + q)^2\}^2 = r^2$.

Which one of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

Answer to the questions No. (15 – 16) according to the following information: $x^2 + 2 = 3x$.

15. What is the value of $\left(x + \frac{2}{x}\right)$? [D.B.- 17]

a) -3 b) -2
c) 3 d) 4

16. Which of the following is the value of $x^3 + \frac{8}{x^3}$? [D.B.- 17]

a) 9 b) 18
c) 21 d) 27

$x^4 - x^2 + 1 = 0$ is an equation.

In the light of the information answer to the questions no. (17 – 18):

17. Which is the value of $\left(x + \frac{1}{x}\right)^2$? [R.B.- 17]

a) 1 b) 2
c) 3 d) 4

18. Which is the value of $x^3 + \frac{1}{x^3}$? [R.B.- 17]

a) 0 b) 1
c) $\sqrt{3}$ d) $3\sqrt{3}$

$x^2 = 5 + 2\sqrt{6}$ is an equation

Answer the questions no. (19 – 20) from above information:

19. What is the value of x? [Dj.B.- 17]

a) $\sqrt{3} - \sqrt{2}$ b) $\sqrt{3} + \sqrt{2}$
c) $\sqrt{2} - \sqrt{3}$ d) $5 - 2\sqrt{6}$

20. $x^3 + \frac{1}{x^3}$ = What? [Dj.B.- 17]

a) $18\sqrt{3}$ b) $15\sqrt{3}$
c) $12\sqrt{2}$ d) $10\sqrt{2}$

Answer to the questions no. (21 – 22) on the basis of the following information: $x + y = 4$ and $xy = 1$.

21. What is the value of x - y? [Ctg.B.- 17]

a) $2\sqrt{3}$ b) $\sqrt{14}$
c) $3\sqrt{2}$ d) $2\sqrt{5}$

22. What is the value of $x^3 + y^3$? [Ctg.B.- 17]

a) 0 b) 24
c) 52 d) 76

If $\left(a - \frac{1}{a}\right)^2 = 16$ then. Answer to the questions No. (23 – 24) from above information:

23. What is the value of $a^2 + \frac{1}{a^2}$? [J.B.- 17]

a) 12 b) 14
c) 18 d) 20

24. Which one is the value of $a^3 - \frac{1}{a^3}$? [J.B.- 17]

a) 52 b) 61
c) 67 d) 76

Answer to the questions no. (25 – 26) on the basis of the following information given below: If $x + \frac{1}{x} = 2$ then -

25. What is the value of $x^3 + \frac{1}{x^3}$?[B.B.- 17]

a) 2 b) 3
c) 4 d) 6

26. What is the value of $x^3 + \frac{1}{x^4}$?[B.B.- 17]

a) 4 b) 2
c) 3 d) 6

If $x + \frac{1}{x} = 3$ then -

Answer to the question numbers (27 – 28) from above information:

27. What is the value of $x^2 + \frac{1}{x^2}$?[C.B.- 16]

a) 5 b) 7
c) 8 d) 9

28. What is the value of $x^3 + \frac{1}{x^3}$?[C.B.- 16]

a) 18 b) 20
c) 27 d) 36

29. If $p + q = 7$ and $pq = 10$ then What is the value of $p^3 + q^3$? [B.B.- 16]

a) 117 b) 133
c) 313 d) 373

30. If $p^2 - 1 = \sqrt{5}p$ then what is the value of $p^3 - \frac{1}{p^3}$? [R.B.- l5]

a) 0 b) $2\sqrt{5}$
c) $3\sqrt{5}$ d) $8\sqrt{5}$

31. If $p + q = 3$ and $pq = 2$ then what is the value of $(p^3 + q^3)$? [D.B.- l5]

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a) 9 b) 18
c) 27 d) 45

32. If $a + b = 3$ and $ab = 1$ then what is the value of $a^3 + b^3 + (a - b)^2$? [Ctg.B.- l5]

a) 23 b) 31
c) 41 d) 49

33. If $x + \frac{1}{x} = 2$ then $x^3 + \frac{1}{x^3}$ = What? [S.B.- l5]

a) 2 b) 3
c) 4 d) 5

34. If $a^2 - \sqrt{2}a + 1 = 0$ then – [D.B.– 15]

i. $a^2 + \frac{1}{a^2} = 2$
ii. $a^3 + \frac{1}{a^3} = -\sqrt{2}$
iii. $a + \frac{1}{a} = \sqrt{2}$

Which one of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

35. Factors of $a^3 - 3ab^2 + 2b^3$ is / are – [R.B.- 15]

i. a - b
ii. a + 2b
iii. $a^2 + ab + 2b^2$

Which one of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

36. If x + y = 1 then – [Ctg.B.- 15]

i. $x^3 + y^3 = 1 - 2xy$
ii. $x^3 + y^3 - xy = 1 - 2xy$
iii. $(x - y)^2 = 1 - 4xy$

Which one of the following is correct?

a) i and ii b) i and iii
c) ii and iii d) i, ii and iii

Creative Questions:

1. $p + q = \sqrt{3}$, $p^2 - q^2 = \sqrt{6}$ and $A = y^4 + \frac{1}{y^4}$. [D.B.- 20]

a) Resolve into factors: $4x^2 - 12xy + 9y^2 - 16z^2$.

b) Prove that, $p^3 + q^3 = \frac{9\sqrt{3}}{4}$.

c) If $A = m^4 + 4m^2 + 2$ then show that, $y^2 - 1 = my$.

2. $P = 9 + 4\sqrt{5}$ and $Q = m^2 - \sqrt{5}m + 1$; $m > 0$. [My.B.- 20]

a) Resolve into factors: $y^2 - 2yz - 4z - 4$.

b) Prove that, $P\sqrt{P} + \frac{1}{P\sqrt{P}} = 34\sqrt{5}$.

c) If Q = 0 then prove that, $m^5 - \frac{1}{m^5} = 11$.

3. $a^4 - 27a^2 + 1 = 0$ and $x^3 + \frac{1}{x^3} = 34\sqrt{5}$, where a, x > 0. [R.B.- 20]

a) Express the set B = {x: $x \in \mathbb{Z}$ and $x^2 < 4$} in tabular method.

b) Find the value of $a^4 - \frac{1}{a^4}$.

c) Prove that, $x = 2 + \sqrt{5}$.

4. (i) $p = \sqrt{3} + \sqrt{2}$ and (ii) $\frac{x + 2a}{x - 2a} + \frac{x + 2b}{x - 2b} = 2$; $a \neq b$. [Ctg.B.- 20]

a) Resolve into factors: $m^2 - 4m + 3$.

b) Determine the value of $\frac{p^6 - 1}{p^3}$.

c) Show that, $x = \frac{4ab}{a + b}$.

5. $x^4 - x^2 + 1 = 0$ and p = 18. [J.B.- 20]

a) Resolve into factors: $4a^2 + \frac{1}{4a^2} - 2 + 4a - \frac{1}{a}$.

b) Find the value of $x^5 + \frac{1}{x^5}$.

c) If $p = a^3 + \frac{1}{a^3}$ then prove that, $a = \frac{3 + \sqrt{5}}{2}$.

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6. **(i) $y^4 = 527 - \frac{1}{y^4}$ (When y > 0) and (ii) $a + \frac{1}{a} = 4$, (When a > 0). [B.B.- 20]**

a) Resolve into factors: $x^4 - 38x^2 + 1$.

b) Show that, $y^3 + \frac{1}{y^3} = 110$ with the help of (i).

c) Prove that, $\frac{a^8 - 1}{a^4} = 112\sqrt{3}$ with the help of (ii).

7. **If $x = \sqrt{2} + 1$ and $y^2 + \frac{1}{y^2} = 14$ where y > 0. [Dj.B.- 19]**

a) If $f(z) = \frac{1}{z^2} - \frac{1}{z} - 12$ then determine $f(-\frac{1}{2})$.

b) Show that, $(1 - \frac{1}{x^{10}})x^5 = 82$.

c) Determine the value of $(1 - \frac{1}{y})(y^3 + \frac{1}{y^3})$ from the given data in the stem.

8. **If $b + \frac{1}{b} = 5$ and $p^4 = 119 - \frac{1}{p^4}$ then- [Ctg.B.- 19]**

a) Resolve into factors: $m^4 - 7m + 1$.

b) Prove that, $\frac{b^8 - 1}{b^4} = 115\sqrt{21}$.

c) Prove that, $p^6 - 1 - 36p^3 = 0$.

9. **(i) $y^2 - 2\sqrt{30} = 11$ where y > 0.**
(ii) $P = \sqrt{3} + \sqrt{2}$. [J.B.- 19]

a) Resolve into factors: $x^3 + 9y^3 + (x + y)^3$.

b) Find the value of $\frac{y^4 - 1}{y^4}$ with the help of (i).

c) Prove the relation (ii) if $p^3 + \frac{1}{p^3} = 18\sqrt{3}$.

10. **If $x^2 - 3 = 2\sqrt{2}$ then - [D.B.- 17]**

a) Find the value of x.

b) Find the value of, $x^4 + \frac{1}{x^4}$.

c) Prove that, $x^5 + \frac{1}{x^5} = 58\sqrt{2}$.

11. **Sum of a number and its multiplicative inverse is $2\sqrt{3}$ [R.B.- 17]**

a) Taking the number as the variable a, express the information by an equation.

b) Find the value of $a^3 + \frac{1}{a^3}$.

c) Prove that, $a = \sqrt{3} + \sqrt{2}$.

12. **If $b^2 - 2\sqrt{6}b + 1 = 0$ then [C.B.- 17]**

a) Show that, $b + \frac{1}{b} = 2\sqrt{6}$.

b) Find the value of $\frac{1}{b^3}(b^6 - 1)$.

c) Prove that, $b^5 + \frac{1}{b^5} = 922\sqrt{6}$.

13. **If $x^2 = 5 + 2\sqrt{6}$, $a + b + c = m$, $a^2 + b^2 + c^2 = n$ and $a^3 + b^3 = p^3$. [Ctg.B.- 17]**

a) Find the value of x.

b) Prove that, $\frac{x^8 + 1}{x^4} = 98$.

c) If C = 0 then show that, $m^3 + 2p^3 = 3mn$.

14. **If $x^2 + \frac{1}{x^2} = 10$ then - [S.B.- 17]**

a) Find the value of $x + \frac{1}{x}$.

b) Prove that, $\frac{x^8 - 1}{x^4} = 40\sqrt{6}$.

c) Find the value of $x^5 - \frac{1}{x^5}$.

15. **If $x^2 - 2x + 1 = 0$ then - [J.B.- 17]**

a) Resolve into factors: $a^4 + a^2 + 1$.

b) Prove that, $x^2 + \frac{1}{x^2} = x^4 + x^{-4}$.

c) Find the value of $x^5 - \frac{1}{x^5}$.

16. **If $p^2 = 5 + 2\sqrt{6}$, $a^3 + a^{-3} = 18\sqrt{3}$ and a, p > 0 then - [B.B.- 17]**

a) Find the value of $p - \frac{1}{p}$.

b) Show that, $a = \sqrt{3} + \sqrt{2}$ when $a^3 - a^{-3} > 0$.

c) Prove that, $\frac{p^{10} + 1}{p^5} = 178\sqrt{3}$.

17. **If $p^2 = 7 + 4\sqrt{3}$ then - [D.B.- 16]**

a) Determine the value of p.

b) Find the value of $\frac{p^6 - 1}{p^3}$.

c) Prove that, $p^5 + \frac{1}{p^5} = 724$.

18. **If $x = 3 + 2\sqrt{2}$ then - [J.B.- 16]**

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a) Determine $\frac{1}{x}$.

b) Find the value of $x^6 + \frac{1}{x^6}$.

c) Prove that, $(\sqrt{x})^3 - \left(\frac{1}{\sqrt{x}}\right)^3 = 14$.

19. If $x + y = \sqrt{3}$ and $x^2 - y^2 = \sqrt{6}$ then [C.B.- 16]

a) Find the value of xy.

b) Show that, $x^3 + y^3 + \frac{\sqrt{27}}{4} = 3\sqrt{3}$.

c) Find the value of $16xy(x^2 + y^2)$.

20. If $x + \frac{1}{x} = 6$ then - [Dj.B.- 16]

d) Find the value of $\left(x - \frac{1}{x}\right)^2$.

a) Show that, $x^3 + \frac{1}{x^3} = 198$.

b) Prove that, $x^5 + \frac{1}{x^5} = 6726$

21. If $a + b + c$ and $a^2 + b^2 + c^2$ are two algebraic expression. [Cig.B.- 16]

a) If 1st expression = 0 then Prove that, $a^3 + b^3 + c^3 = 3abc$.

b) If 1st expression = 10 and 2nd expression = 38 then what is the value of $(a - b)^2 + (b - c)^2 + (c - a)^2$

c) If 1st expression = 0 then Prove that, $\frac{(b+c)^2}{6bc} + \frac{(c+a)^2}{6ca} + \frac{(a+b)^2}{6ab} = \frac{1}{2}$.

22. If $p + q = 6$ and $pq = 3$ where $p > q$ then - [Dj.B.- 15]

a) Find the value of $(p - q)$.

b) Find the value of $p^3 - q^3 - 5(p^2 - q^2)$.

c) Show that, $p^5 + q^5 = 4806$.

23. The square of a positive number is 1 less than its five times. [D.B.- 15]

a) If the positive number is x then show that, $x + \frac{1}{x} = 5$.

b) Determine the value of $x^3 - \frac{1}{x^3}$.

c) Prove that, $x^5 + \frac{1}{x^5} = 2525$.

24. If $a = \sqrt{6} + \sqrt{5}$ then - [R.B.- 15]

a) Determine $\frac{1}{a}$.

b) Determine the value of $a^3 + \frac{1}{a^3}$.

c) Determine the value of $a^6 + \frac{1}{a^6}$.

25. If $x^2 - \sqrt{5}x + 1 = 0$ is an algebraic equation. [C.B.- 15]

a) Find the value of $x + \frac{1}{x}$.

b) Find the value of $x^4 - \frac{1}{x^4}$.

c) Prove that, $x^5 + \frac{1}{x^5} = 5\sqrt{5}$.

26. If $x = 5 - 2\sqrt{6}$ then -

a) Determine $x + \frac{1}{x}$.

b) Find the value of $\frac{x^6 - 1}{x^3}$.

c) Prove that, $(\sqrt{x})^3 + \left(\frac{1}{\sqrt{x}}\right)^3 = 18\sqrt{3}$.

27. Sum of a number and its multiplication inverse is 3.

a) Resolve into factors: $a^3 - 9b^3 + (a + b)^3$.

b) Taking the number as the variable x then find the value of $x^3 - \frac{1}{x^3}$.

c) Taking the number as the variable x then prove that, $x^5 + \frac{1}{x^5} = 123$.

28. If 4 multiples of any number is subtracted from the square of the original number then the result is 1.

a) Find $(x - \frac{1}{x})$ when x is the original number.

b) Find the value of $x^3 + \frac{1}{x^3}$.

c) Find the value of $x^6 + \frac{1}{x^6}$.

29. $x^3 - \frac{1}{x^3} = 46\sqrt{5}$, $a^2 - 2\sqrt{6}a + 1 = 0$ and x, a > 0 then -

a) Resolve into factors: $3x^2 - x - 14$.

b) Prove that, $x = \sqrt{6} + \sqrt{5}$.

c) Determine the value of $\frac{a^{10} + 1}{a^5}$.

30. If $x = \sqrt{13 + 2\sqrt{42}}$ then -

a) Find the value of $x + \frac{1}{x}$.

b) Prove that, $x^3 - \frac{1}{x^3} = 54\sqrt{6}$.

c) Find the value of $x^5 + \frac{1}{x^5}$.

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31. **If $a + b = \sqrt{3}$ and $a^2 - b^2 = \sqrt{6}$ then answer the following questions:**

a) Find the value of b.

b) Show that, $a^3 + b^3 - \frac{\sqrt{12}}{8} = 2\sqrt{3}$.

c) Find the value of $3ab(a^2 + b^2)$.

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