

Practice Sets for Mathematics for Class VIII

Covered all topics CBSE, ICSE, NCERT and all State Boards

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Introduction

This Books is prepared to boost concept in Mathematics, along with keeping in mind for Olympiad and Competitive based problems.

Part I

Problems on Algebra

Chapter 1

Formula based Square and Cube problems

$$1. (a+b)^2 = a^2 + 2ab + b^2 = (a-b)^2 + 4ab$$

$$2. (a-b)^2 = a^2 - 2ab + b^2 = (a+b)^2 - 4ab$$

$$3. a^2 + b^2 = \begin{cases} (a+b)^2 - 2ab \\ (a-b)^2 + 2ab \\ \frac{1}{2} \{ (a+b)^2 + (a-b)^2 \} \end{cases}$$

$$4. \begin{cases} a^2 - b^2 &= (a+b) \cdot (a-b) \\ (a+b)^2 - (a-b)^2 &= 4ab \\ (a+b)(a-b) &= a^2 - b^2 \\ ab &= \left(\frac{a+b}{2} \right)^2 - \left(\frac{a-b}{2} \right)^2 \end{cases}$$

$$5. (a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

$$6. a^2 + b^2 + c^2 - ab - bc - ca = \frac{1}{2} \{ (a-b)^2 + (b-c)^2 + (c-a)^2 \}$$

$$7. (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 = a^3 + b^3 + 3ab(a+b)$$

$$8. (a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 = a^3 - b^3 - 3ab(a-b)$$

$$9. a^3 + b^3 = \begin{cases} (a+b)^3 - 3ab(a+b) \\ (a+b) \{ (a+b)^2 - 3ab \} \\ (a+b)(a^2 - ab + b^2) \end{cases}$$

$$10. a^3 - b^3 = \begin{cases} (a-b)^3 + 3ab(a-b) \\ (a-b) \{ (a-b)^2 + 3ab \} \\ (a-b)(a^2 + ab + b^2) \end{cases}$$

$$11. a^3 + b^3 + c^3 - 3abc = \begin{cases} (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca) \\ \frac{1}{2}(a+b+c) \{ (a-b)^2 + (b-c)^2 + (c-a)^2 \} \end{cases}$$

$$12. (a+b+c)^3 = a^3 + b^3 + c^3 + 3(a+b)(b+c)(c+a)$$

1.1 Problems

1.1.1 Check whether perfect square or not

1. $x^2 + 6xyz + 9y^2z^2$

2. $x^4 + 6x^2 + 16$

1.1.2 Which term needs to be added to make it a perfect square

1. $x^4 + 6x^2 + 16$

3. $a^6 - 6a^3 + 1$

2. $a^2 + 9b^2$

4. $4a^4 + b^4$

1.1.3 Evaluate using binomial expansion formula

1. 102^2

2. 99^2

3. 1001^2

4. 999^2

5. 703^2

1.1.4 Expand the followings

1. $(x + 4y)^2$

3. $(x + y - z)^2$

2. $(x + 4y - 5)^2$

4. $(x - 2y + 3z)^2$

1.1.5 Simplify

1. $82^2 - 18^2$

6. 95×105

10. $178 \times 178 - 22 \times 22$

2. $467^2 - 33^2$

7. 1.8×2.2

11. $\frac{198^2 - 102^2}{96}$

3. $79^2 - 69^2$

8. 9.8×10.2

12. $1.73 \times 1.73 - 0.27 \times 0.27$

4. 197×203

9. $\frac{58^2 - 42^2}{16}$

13. $\frac{8.63 \times 8.63 - 1.37 \times 1.37}{.726}$

14. $\frac{0.75 \times 0.75 + 2 \times 0.75 \times 0.25 + 0.25 \times 0.25 \times 0.25}{0.75 \times 0.75 - 2 \times 0.75 \times 0.25 + 0.25 \times 0.25 \times 0.25}$

1.1.6 Evaluate the followings

1. If $x + \frac{1}{x} = 2$, then calculate

(a) $x^2 + \frac{1}{x^2}$

(b) $x^3 + \frac{1}{x^3}$

(c) $x^4 + \frac{1}{x^4}$

(d) $x^{2025} + \frac{1}{x^{2025}}$

(e) $x^a + \frac{1}{x^a}$, where a is any real number.

2. If $x + \frac{1}{x} = -2$, then calculate

- (a) $x^2 + \frac{1}{x^2}$ (b) $x^3 + \frac{1}{x^3}$ (c) $x^4 + \frac{1}{x^4}$ (d) $x^{2025} + \frac{1}{x^{2025}}$
 (e) $x^a + \frac{1}{x^a}$, where a is any integer.

3. If $x + \frac{1}{x} = \sqrt{3}$, then calculate

- (a) $x^2 + \frac{1}{x^2}$ (b) $x^3 + \frac{1}{x^3}$ (c) $x^4 + \frac{1}{x^4}$ (d) $x^5 + \frac{1}{x^5}$ (e) $x^6 + \frac{1}{x^6}$ (f) $x^{2025} + \frac{1}{x^{2025}}$
 (g) $x^a + \frac{1}{x^a}$, where a is any positive integer number.

4. If $x + \frac{1}{x} = -\sqrt{3}$, then calculate

- (a) $x^2 + \frac{1}{x^2}$ (b) $x^3 + \frac{1}{x^3}$ (c) $x^4 + \frac{1}{x^4}$ (d) $x^5 + \frac{1}{x^5}$ (e) $x^6 + \frac{1}{x^6}$ (f) $x^{2025} + \frac{1}{x^{2025}}$
 (g) $x^a + \frac{1}{x^a}$, where a is any positive integer number.

5. If $x + \frac{1}{x} = 3$, then calculate

- (a) $x^2 + \frac{1}{x^2}$ (b) $x^3 + \frac{1}{x^3}$ (c) $x^4 + \frac{1}{x^4}$ (d) $x^5 + \frac{1}{x^5}$ (e) $x^6 + \frac{1}{x^6}$ (f) $x^7 + \frac{1}{x^7}$

6. If $2a + \frac{1}{3a} = 6$, then calculate

- (a) $3a + \frac{1}{2a}$ (b) $9a^2 + \frac{1}{4a^2}$ (c) $27a^3 + \frac{1}{8a^3}$

7. If $x^2 - 4x + 1 = 0$, then calculate

- (a) $x + \frac{1}{x}$ (b) $x^2 + \frac{1}{x^2}$ (c) $x^3 + \frac{1}{x^3}$ (d) $x^4 + \frac{1}{x^4}$

8. If $9a + \frac{1}{4a} = 6$, then calculate

- (a) $6a + \frac{1}{6a}$ (b) $36a^2 + \frac{1}{36a^2}$ (c) $216a^3 + \frac{1}{216a^3}$

9. If $x^2 - 4x + 4 = 0$, then calculate

- (a) $x + \frac{1}{x}$ (b) $x^2 + \frac{1}{x^2}$ (c) $x^3 + \frac{1}{x^3}$ (d) $\frac{x^2}{4} + \frac{1}{4x^2}$ (e) $x^2 + \frac{16}{x^2}$

10. If $a - b = 3$, $ab = 40$, then calculate

- (a) $a + b$ (b) $a^2 + b^2$ (c) $a^2 - b^2$ (d) $a^3 - b^3$ (e) $a^3 + b^3$

11. If $a + b = 8$, $ab = 15$, then calculate

- (a) $a - b$ (b) $a^2 + b^2$ (c) $a^2 - b^2$ (d) $a^3 - b^3$ (e) $a^3 + b^3$

12. If $x = 3 + 2\sqrt{2}$, then calculate

$$(a) \ x + \frac{1}{x} \quad (b) \ x^2 + \frac{1}{x^2} \quad (c) \ x^2 - \frac{1}{x^2} \quad (d) \ x^3 + \frac{1}{x^3} \quad (e) \ x^3 - \frac{1}{x^3}$$

13. If $x - \frac{1}{x} = 3$, then calculate

$$(a) \ x + \frac{1}{x} \quad (b) \ x^2 + \frac{1}{x^2} \quad (c) \ x^2 - \frac{1}{x^2} \quad (d) \ x^3 + \frac{1}{x^3} \quad (e) \ x^4 + \frac{1}{x^4}$$

14. If $x^2 + \frac{1}{x^2} = 18$, then calculate

$$(a) \ x + \frac{1}{x} \quad (b) \ x - \frac{1}{x}$$

15. If $x - y = 7$, $xy = 8$, calculate (a) $x^2 + y^2$, (b) $x^3 - y^3$.

16. If $3x + 5y = 11$, $xy = 2$, calculate (a) $9x^2 + 25y^2$, (b) $27x^3 + 125y^3$.

17. If $x = \frac{2}{3}$, $y = \frac{3}{4}$, evaluate $81x^2 + 16y^2 - 72xy$.

18. If $2x + 3y = 14$, $2x - 3y = 2$, calculate (a) xy , (b) $4x^2 + 9y^2$, (c) $x^2 + y^2$.

1.1.7 Factorisation

Part II

Miscellaneous Practice Set

Chapter 1

MATHEMATICS Problem Set 01

Maximum Marks: 50
Start Time:

Time: 1 Hour 30 Minutes
End Time:

Conceptual Questions (1 Mark each)