



Grade: IX

Subject: Mathematics

Topic: Surds.

Worksheet No: 6

I. Reduce to an equivalent fraction with a rational denominator.

1. $\frac{5\sqrt{3} + \sqrt{7}}{4\sqrt{3} + 2\sqrt{7}}$

2. $\frac{3\sqrt{2} + 2\sqrt{3}}{3\sqrt{2} - 1\sqrt{3}}$

3. $\frac{4 + 3\sqrt{2}}{3 - 2\sqrt{2}}$

4. $\frac{3\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$

5. $\frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}}$

6. $\frac{\sqrt{x^2+1} - \sqrt{x^2-1}}{\sqrt{x^2+1} + \sqrt{x^2-1}}$

7. $\frac{1}{1 + \sqrt{2} + \sqrt{3}}$

8. $\frac{\sqrt{2} + 1}{\sqrt{2} - 1}$

9. $\frac{\sqrt{3}}{2 - \sqrt{3}}$

10. $\frac{8 - 5\sqrt{2}}{3 - 2\sqrt{2}}$

11. $\frac{3}{\sqrt{5} - \sqrt{2}}$

12. $\frac{3 + \sqrt{5}}{3 - \sqrt{5}}$

13. $\frac{\sqrt{5} + \sqrt{3}}{4 + \sqrt{15}}$

II. Simplify:

$$14. \frac{1}{x + \sqrt{x^2 - 1}} + \frac{1}{x - \sqrt{x^2 - 1}}$$

$$15. \frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$$

$$16. \frac{\sqrt{2}(\sqrt{3} + 1)(2 - \sqrt{3})}{(\sqrt{2} - 1)(3\sqrt{3} - 5)(2 + \sqrt{2})}$$

$$17. \frac{4}{\sqrt{3} + \sqrt{5} - \sqrt{2}}$$

$$18. (3 + 2\sqrt{2})^{-1} + (3 - 2\sqrt{2})^{-1}$$

$$19. \frac{x + \sqrt{x^2 - 1}}{x - \sqrt{x^2 - 1}} - \frac{x - \sqrt{x^2 - 1}}{x + \sqrt{x^2 - 1}}$$

$$20. \frac{\sqrt{x^2 + 1} + \sqrt{x^2 - 1}}{\sqrt{x^2 + 1} - \sqrt{x^2 - 1}} + \frac{\sqrt{x^2 + 1} - \sqrt{x^2 - 1}}{\sqrt{x^2 + 1} + \sqrt{x^2 - 1}}$$

III. Rationalise the denominator of:

$$21. \frac{1}{\sqrt[3]{3} + \sqrt[3]{2}}$$

$$22. \frac{1}{\sqrt[3]{4} - \sqrt[3]{3}}$$

ANSWERS

1. $\frac{23-3\sqrt{21}}{10}$

2. $5+2\sqrt{6}$

3. $24+17\sqrt{2}$

4. $9+2\sqrt{15}$

5. $\frac{a+\sqrt{a^2-x^2}}{x}$

6. $x^2-\sqrt{x^4-1}$

7. $\frac{1}{4}(2+\sqrt{2}-\sqrt{6})$

8. 5828

9. 6464

10. 5414

11. 3650

12. 6854

13. 504

14. $2x$

15. $\sqrt{3}(1+\sqrt{2})$

16. $2+\sqrt{3}$

17. $\frac{1}{4}(\sqrt{30}+2\sqrt{3}-3\sqrt{2})$

18. 198

19. $4x\sqrt{x^2-1}$

20. $2x^2$

21. $\frac{\sqrt[3]{9}-\sqrt[3]{6}+\sqrt[3]{4}}{5}$

22. $\sqrt[3]{16}+\sqrt[3]{12}+\sqrt[3]{9}$