Radical Expressions (Simplifying, Adding, Subtracting, Multiplying, Dividing and Rationalizing the Denominator)

$$\sqrt[n]{x}$$

Square Root	Perfect Squares
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81
10	100
11	121
12	144
13	169
14	196
15	225

Cubes Root	Perfect Cubes
1	1
2	8
3	27
4	64
5	125
6	216
7	343
8	512
9	729
10	1000

Directions: Find each of the following square roots.

1. $\sqrt{144}$

2. $-\sqrt{144}$

3. $\sqrt{-144}$

4. $\sqrt[3]{-27}$

5. $\sqrt{36x^8}$

6. $\sqrt[4]{81x^{24}y^{16}}$

Directions: Simplify each radical expression.

7. $\sqrt{50}$

8. $4\sqrt{75}$

9. $\sqrt{a^2b^3}$

10. $\sqrt{48x^4y^3}$

11. $\sqrt{12x^7y^6}$

12. $2ab\sqrt[3]{40a^5b^4}$

13. $\sqrt[3]{54a^6b^2c^4}$

14. $\sqrt[5]{64x^8y^4z^{11}}$

Directions: Add or subtract the radical expressions and simplify your answer.

15. $5\sqrt{3}-4\sqrt{3}+6\sqrt{3}$

16. $3\sqrt{8}+6\sqrt{18}$

17. $7\sqrt{75xy^3}-4y\sqrt{12xy}$

18. $10\sqrt[3]{8a^4b^2} + 11a\sqrt[3]{27ab^2}$

19. $y\sqrt[3]{24x^5y} + 3x\sqrt[3]{81x^2y^4}$

Directions: Multiply or divide the radical expressions and simplify your answer.

20. $\left(3\sqrt{5}\right)\left(2\sqrt{7}\right)$

21. $\sqrt{3}\left(2\sqrt{6}-5\sqrt{12}\right)$

22. $\left(\sqrt{3}+\sqrt{5}\right)\left(4\sqrt{3}-\sqrt{5}\right)$

23. $\left(\sqrt{x}+2\right)^2$

24. $\left(3\sqrt{x}-2\sqrt{y}\right)^2$

25. $\left(\sqrt{6}+\sqrt{3}\right)\left(\sqrt{6}-\sqrt{3}\right)$

26. $\sqrt{\frac{5}{4}}$

27. $\sqrt{\frac{5}{6}}$

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

29. $\dfrac{6}{\sqrt{5}-\sqrt{2}}$

30. $\dfrac{\sqrt{5}+3}{\sqrt{5}-2}$