

Name: _____

Conjugate Theorem

1) Rationalize the denominator and simplify:

1) $\frac{5x}{\sqrt{y}}$

2) $\frac{3x}{\sqrt{2y}}$

3) $\frac{\sqrt{2x}}{\sqrt{11}}$

4) $\frac{x-1}{\sqrt{x+1}}$

5) $\frac{2x}{\sqrt{x+1}}$

6) $\frac{x-3}{\sqrt{x+3}}$

7) $\frac{\sqrt{x+5}}{\sqrt{x-5}}$

8) $\sqrt{\frac{x-3}{y^5}}$

9) $\sqrt{10a} + \frac{1}{\sqrt{10a}}$

10) $\frac{2\sqrt{3}}{4\sqrt{2} + \sqrt{7}}$

11) $\frac{\sqrt{c}}{\sqrt{c} - 2\sqrt{d}}$

12) $\frac{2\sqrt{10} - 3\sqrt{15}}{6\sqrt{5} + 4\sqrt{2}}$

13) $\frac{5}{\sqrt[3]{a} + \sqrt[3]{b}}$

14) $\frac{\sqrt{5}}{\sqrt{3} - \sqrt{5}}$

15) $\frac{\sqrt{2}}{5\sqrt{2} + \sqrt{5}}$

16) $\frac{1}{\sqrt[3]{2a} + 3}$

2) Calculate:

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

3) 1) Rationalize the denominator of the fraction $\frac{3\sqrt{7}}{4 - \sqrt{7}}$ and simplify the answer obtained.

2) Verify that $\frac{3\sqrt{7}}{4 - \sqrt{7}} + \frac{2 - 4\sqrt{7}}{3}$ is a natural number.

- 4) Simplify the expression and deduce if the answer is a rational number?

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

- 5) Simplify: x and $y > 0$

$$1) \sqrt{\frac{(x-2)^2}{(x-y)(x+y) + y^2 - 4x + 4}}$$

$$2) \frac{\sqrt{a^2 - b^2} \cdot \sqrt{ab^3}}{\sqrt{(a+b)(a^2b^3 - ab^4)}} \quad a, b > 0$$

- 6) If $(\sqrt{2} - 1)x = \sqrt{2} + 1$, evaluate $x^2 - 2x + 1$

- 7) 1) Carry out $(\sqrt{6} - \sqrt{5})(\sqrt{6} + \sqrt{5})$

2) Deduce that $\frac{1}{\sqrt{6} + \sqrt{5}} = \sqrt{6} - \sqrt{5}$

3) Use the previous result to write $F = \frac{\sqrt{6} - \sqrt{5}}{\sqrt{6} + \sqrt{5}}$ without a radical in the denominator

- 8) Given $(3 - 2\sqrt{2})x = 1$ and $(3 + 2\sqrt{2})y = 1$. Show that $x^2 - y^2 = 6(x - y)$