Simplify, without the use of a calculator.

1. $\dfrac{\frac{1}{2}+\frac{2}{3}}{\frac{1}{4}+\frac{1}{3}}$

2. $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}$

3. $\dfrac{x+y}{\frac{1}{x}+\frac{1}{y}}$

Give an alternate form of each expression.

4. $\sec^2\theta - 1 =$

5. $\cot^2 x - \csc^2 x =$

6. $\csc^2\theta =$

7. $1 + \cot^2\theta =$

8. $\sin^2\theta - 1 =$

9. $1 - \cos^2\theta =$

10. $\dfrac{\sec\theta}{\csc\theta} =$

11. $\dfrac{1}{\csc\theta} =$