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Find all values that make the expression undefined.

1) $\frac{5y - 9}{y^2 - 49}$

2) $\frac{x^2 - 9}{x^2 - 13x + 40}$

Write the expression in lowest terms.

3) $\frac{y^2 + 9y + 18}{y^2 + 15y + 54}$

4) $\frac{y^2 - 4y - 21}{y^2 - 6y - 27}$

5) $\frac{a^2 - b^2 - 5a + 5b}{4a + 4b - 20}$

6) $\frac{x^2 - y^2}{x^2 - xy - 4x + 4y}$

Multiply. Write the answer in lowest terms.

7) $\frac{k^2 + 7k + 12}{k^2 + 13k + 36} \cdot \frac{k^2 + 9k}{k^2 - 6k - 27}$

8) $\frac{3(k - 7)^2}{21(k + 7)} \cdot \frac{7(k + 7)^2}{9(k - 7)}$

Perform the indicated operation. Write the answer in lowest terms.

9) $\left(\frac{x^2 + 8x + 15}{x^2 + 5x} \cdot \frac{5x}{x^2 + 6x + 9} \right) \div \frac{x + 5}{x + 3}$

10) $\frac{b^2 - 25a^2}{25a^3 + 10a^2b + ab^2} \div \frac{b^2 - 10ab + 25a^2}{-a^2 - ab^2}$

Find the least common denominator (LCD).

$$11) \frac{1}{20x^5}; \frac{1}{12x^4}; \frac{1}{15x^2}$$

$$12) \frac{3}{m^2 + 4m}; \frac{3}{m^2 + 2m - 8}$$

Rewrite the expression with the indicated denominator.

$$13) \frac{3}{5x} = \frac{\quad}{20x^2}$$

$$14) \frac{-16(x-7)}{x(x+2)} = \frac{\quad}{x^3 - 2x^2 - 8x}$$

Perform the indicated operation and simplify.

$$15) \frac{4m}{m-5} + \frac{-20}{m-5}$$

$$16) \frac{4x-9}{x} + \frac{7x+6}{3x}$$

$$17) \frac{7x}{x+6} + \frac{1}{x-6}$$

$$18) \frac{7}{y-5} - \frac{6}{y-3}$$

Perform the indicated operation and simplify.

$$19) \frac{3}{3r^2 - 5rs - 2s^2} - \frac{6}{6r^2 - 13rs + 2s^2} + \frac{7}{18r^2 + 3rs - s^2}$$

$$20) \frac{x}{x^2 - 16} - \frac{6}{x^2 + 5x + 4}$$