

Name: _____

This assignment is worth 100 points. You will be awarded 40 points for attempting the entire assignment (that is answer all problems). I will then select 20 problems at random to grade, each worth 3 points each. The space left between each question is indicative of how much work you should show. If there are any problems you find particularly difficult, circle them in red. If there are any particular questions you would like feedback on, circle them in green. These are examples of questions that might appear on an exam/quiz. If you use a calculator to help, make sure you can also do them without it.

1. Simplify each of the following expressions.

(a) $\frac{x^3 + 10x^2}{x^2 + 6x - 40}$

Answer: _____

(d) $\frac{6x^2 + 13x + 5}{3x^2 + 26x + 35}$

Answer: _____

(b) $\frac{x^2 + 18x + 72}{2x^2 + 11x - 6}$

Answer: _____

(e) $\frac{-x^2 + 10x - 9}{-x^2 + 6x + 27}$

Answer: _____

(c) $\frac{x^2 - 3x - 28}{49 - x^2}$

Answer: _____

(f) $\frac{x^3 + x^2 - 20x}{x^4 - 12x^3 + 36x^2}$

Answer: _____

2. Perform the indicated operation and simplify.

$$(a) \frac{x^2 + 14x + 40}{x^2 + 2x - 8} \cdot \frac{x^2 + 5x - 14}{x^2 + 7x - 30}$$

Answer: _____

$$(b) \frac{4x^3 - x^2 - 3x}{x^2 - 10x + 25} \cdot \frac{10 + 3x - x^2}{x^4 - x^3}$$

Answer: _____

$$(c) \frac{x^2 + 5x - 24}{x^2 - 5x + 4} \div \frac{x^2 + x - 12}{x - 1}$$

Answer: _____

$$(d) \frac{6x^2 + x^3 - x^4}{x^2 - 4} \div \frac{3x^3 - 9x^2}{x^2 + 6x - 16}$$

Answer: _____

$$(e) \frac{3x^2 + 23x + 14}{x^2 + 4x + 3} \div \frac{6x^2 + 13x + 6}{x^2 + 2x + 1}$$

Answer: _____

$$(f) \frac{2}{x + 4} \div \frac{6x^3 + 17x^2}{x^2 + 3x - 4}$$

Answer: _____

$$(g) 5x^2 - 18x - 8 \div \frac{x - 4}{x + 6}$$

Answer: _____

3. Perform the indicated operation and simplify.

(a) $\frac{2x}{x+9} - \frac{x-1}{x}$

Answer: _____

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

Answer: _____

(c) $\frac{9}{x^2-4} - \frac{7x}{x^2-4x+4}$

Answer: _____

(d) $\frac{3}{6x-x^2} - \frac{x}{x^2-5x-6}$

Answer: _____

$$(e) \frac{2}{x^2 - 4x - 12} + \frac{8x}{x^2 + 12x + 20}$$

Answer: _____

$$(f) \frac{2}{3x^2} - \frac{1}{4x^7} + \frac{7}{6x^3}$$

Answer: _____

$$(g) \frac{2x + 1}{4x^2 - 3x - 7} - \frac{x + 3}{x + 1} + \frac{x}{4x - 7}$$

Answer: _____

$$(h) \frac{3}{x^2} + \frac{x + 9}{x^2 + 5x} - \frac{2}{x^2 + 10x + 25}$$

Answer: _____

4. Rationalise the denominator for each of the following expressions. You may assume all letters represent positive numbers.

(a) $\frac{2}{4 - \sqrt{x}}$

Answer: _____

(f) $\frac{9}{\sqrt{y}}$

Answer: _____

(b) $\frac{9}{\sqrt{3y} + 2}$

Answer: _____

(g) $\frac{3}{7x}$

Answer: _____

(c) $\frac{4}{\sqrt{7} - 6\sqrt{x}}$

Answer: _____

(h) $\frac{1}{\sqrt[4]{x}}$

Answer: _____

(d) $\frac{-6}{\sqrt{5x} + 10\sqrt{y}}$

Answer: _____

(i) $\frac{12}{\sqrt[5]{3x^2}}$

Answer: _____

(e) $\frac{x + 4}{x - \sqrt{x}}$

Answer: _____

(j) $\frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$

Answer: _____

5. Perform long division on the following expressions.

(a) Divide $7x^2 + 4x - 9$ by $x - 1$.

(c) Divide $x^4 - 2x^2 + 7x$ by $x - 4$.

Answer: _____

Answer: _____

(b) Divide $8x^3 - 4x + 1$ by $x + 6$.

(d) Divide $2x^4 - 9x^3 + 2x + 8$ by $x + 3$.

Answer: _____

Answer: _____

(e) Divide $8x^4 + x^3 - 3x^2 + 1$ by $x^2 - 2$.

(g) Divide $42x^2 - 33$ by $7x + 7$.

Answer: _____

Answer: _____

(f) Divide $2x^2 - 17x - 38$ by $2x + 3$.

(h) Divide $x^4 + 4x^3 + x - 1$ by $x^2 + 3x - 5$.

Answer: _____

Answer: _____

(i) Divide $4x^5 - 7x^3 + x^2 - 4x + 2$ by $2x^2 - 3x - 6$.

Answer: _____