Fourteenth Set of Homework

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Due: Thursday March 17

Please note: You should fully justify your answers.

Review of fractions

1. Evaluate:
   (a) $2 - \frac{3}{5}$
   (b) $\frac{12}{5} \cdot \frac{10}{3}$
   (c) $\frac{\frac{3}{4}}{\frac{8}{9}}$
   (d) $\frac{2}{3}\left(\frac{1}{2} - \frac{3}{4}\right)$
   (e) $x^2 - x$, when $x = \frac{3}{5}$
   (f) $4x - 3y$, when $x = -\frac{7}{8}$ and $y = \frac{2}{5}$
   (g) $\frac{x+y}{z}$, when $x = 2$, $y = -\frac{3}{4}$, and $z = \frac{1}{2}$

Rational expressions

1. Determine the values of x for which the following expression is defined.
   (a) $\frac{x^3 - 8}{x + 2}$
   (b) $\frac{x^2 - 5}{3x - 4}$
   (c) $\frac{3x - 5}{x^3 - 8}$
   (d) $\frac{2x - 1}{x^3 + x^2 - 2x}$
   (e) $\frac{x^2 - 4}{x^2 + 5}$
   (f) $\frac{x^2 + 7x - 44}{-2x^2 + 5x + 12}$
   (g) $\frac{x^3 + 27}{x^2 + 9x + 18}$
   (h) $\frac{x^2 - 6x + 5}{x^2 - 2x - 2}$
   (i) $\frac{3x}{x^4 - 81}$

2. Simplify each of the following. Assume that all rational expressions that appear are defined.

(a) $\dfrac{2a^2b^3}{ab^4c}$

(b) $\dfrac{-45x^4y}{75x^5y^3}$

(c) $\dfrac{x^5 - 3x^4 + 7x^3 + x^2}{x^3}$

(d) $\dfrac{x^2 - 4}{3x + 6}$

(e) $\dfrac{a^4 - 16}{a^3 + 4a}$

(f) $\dfrac{xy - xy^2}{x - 1}$

(g) $\dfrac{x^4 - 13x^2 + 36}{x^2 - x - 6}$

(h) $\dfrac{10x^3 - 10x}{5x^3 + 5x^2 + 5x}$

(i) $\dfrac{a - b}{b - a}$

(j) $\dfrac{x - 5}{-x^2 - 2x + 35}$

(k) $\dfrac{x^2 + 3x - 10}{5x - x^2 - 6}$

(l) $\dfrac{2x^2 - 7x + 3}{9 - x^2}$