

Math 190 Quiz 5

October 6, 2014

Name: ANSWERS

Instructions: No calculators. Use your own scrap. Write your fully simplified answers in the space provided.

1. Complete the following formulas:

(a) $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$ (b) $\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$ (c) $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$

2. Long division: $\frac{2x^3 - 9x^2 + 15}{2x - 5} = x^2 - 2x - 5 - \frac{10}{2x - 5}$

3. Factor $x^3 + 3x^2 - 10x - 24$ completely given that $x + 2$ is a factor: $(x+2)(x-3)(x+4)$

4. Compute the following. Your answers must be in lowest terms:

(a) $\frac{6}{5} \cdot \frac{10}{36} \div \frac{3}{4} = \frac{4}{9}$ (b) $\frac{8x^3}{7y^4} \cdot \frac{14y^6}{16x^2} = xy^2$

(c) $\frac{8ab^3}{9a^2b} \div \frac{16a^2b^2}{18ab^3} = \frac{b^3}{a^2}$ (d) $\frac{4x^3}{7y^2} \cdot \frac{6z^5}{5x^6} \div \frac{24z^2}{35x^6} = \frac{x^3 z^3}{y^2}$

5. Perform the indicated operations. Your answers must be in lowest terms:

(a) $\frac{x}{x^2 - 16} \div \frac{x^2}{x^2 + 16} = \frac{x^2 + 16}{x(x-4)(x+4)}$ (b) $\frac{a^3 - a^2b}{ac - a} \div \left(\frac{a-b}{c-1}\right)^2 = \frac{a(c-1)}{a-b}$

(c) $\frac{x^3 + 2x^2 - 4x - 8}{x^2 + x - 6} \cdot \frac{x^2 - 9}{x^2 - 4x + 2x - 8} = \frac{(x+2)(x-3)}{x-4}$

(d) $\frac{3a^2 + 7ab - 20b^2}{a^2 + 5ab + 4b^2} \div \frac{3a^2 - 17ab + 20b^2}{3a - 12b} = \frac{3}{a+b}$

(e) $\frac{r^2 - s^2}{r^2 + rs + s^2} \cdot \frac{r^3 - s^3}{r^2 + s^2} \div \frac{r^4 - s^4}{r^2 - s^2} = \frac{(r-s)(r^2 - s^2)}{(r^2 + s^2)^2}$

6. Compute the following. Your answers must be in lowest terms:

(a) $\frac{3}{4} - \frac{1}{8} + \frac{2}{3} = \frac{31}{24}$ (b) $\frac{2x-4}{x+2} - \frac{x-6}{x+2} = 1$

(c) $2 + \frac{1}{x} + \frac{x}{3x+9} - \frac{3}{x^2+3x} = \frac{7}{3}$ (d) $\frac{1}{27x^3-1} - \frac{1}{9x^2-1} = \frac{-9x^2}{(3x-1)(3x+1)(9x^2+3x+1)}$

(e) $\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$ (f) $\frac{2x-2}{x^2+4x+3} - \frac{x-1}{x^2+5x+6} = \frac{x-1}{(x+1)(x+2)}$

(g) $5 - \frac{x}{2x+1} = \frac{9x+5}{2x+1}$ (h) $\left(1 + \frac{2}{x+1}\right)\left(1 + \frac{2}{x+3}\right)\left(1 + \frac{2}{x+5}\right)\left(1 + \frac{2}{x+7}\right) = \frac{x+9}{x+1}$

Bonus Problem (must complete the rest of the quiz to be eligible):

Simplify: $\frac{1 + \frac{1}{x+3}}{1 - \frac{1}{x-3}} = \frac{(x+4)(x-3)}{(x-4)(x+3)}$