Name: _____
MATH 101
Fall 2023
HW 3: Due 09/18

"I saw a lot of my body. . . and I didn't like it."
–David Rose, Schitt's Creek

Problem 1. (10pt) Showing all your work, simplify the following as much as possible (express any denominators using negative powers):

(a) $ab(a^3b^2)^0$

(b) $x^4y^9x^{22}y^5$

(c) $\dfrac{r^0s^5}{r^4s^3}$

(d) $(x^8y^{10})\left(\dfrac{x^3}{y^8}\right)$

(e) $\dfrac{r^{12}s^4t^5}{s^3r^{20}t^5}$

Problem 2. (10pt) Showing all your work, simplify the following as much as possible (do not express your answer using any negative powers):

(a) $\dfrac{a^6 b^3}{a^{18} b^5}$

(b) $\dfrac{x^6 y^9}{x^{-6} y^{16}}$

(c) $\dfrac{r^{18} s^7 r^{-3} s^{-2}}{r^{11} s^5}$

(d) $\dfrac{a^0 b^{-5}}{a^{-8} b^7} \cdot \dfrac{b^3}{a^6}$

(e) $\dfrac{x}{y} \left(\dfrac{x^3 y^{-11}}{x^{-5} y^{12}} \cdot \dfrac{x^{-4} y^9}{x^4 y^{-3}} \right)^0$

Problem 3. (10pt) Showing all your work, simplify the following as much as possible (do not express your answer using any negative powers):

(a) $\left((x^2y^3)^3\right)^3$

(b) $(r^3s)^6(r^2s^9)^4$

(c) $(x^{-4}y^6)^{-2}(x^2y^5)$

(d) $b^6\left(\dfrac{a^6b^3}{a^{-3}}\right)^{-4}$

(e) $(xy^2)^{-3}\left(\dfrac{(xy)^2}{xy^{-1}}\right)^{-1}$

Problem 4. (10pt) Showing all your work, simplify the following as much as possible:

(a) $\dfrac{(4x^2)^3(3x^4)}{(6x^3)^4}$

(b) $\left(-\dfrac{3x^{-2}y^7}{2x^3y^5}\right)^{-2}$

(c) $\left(\dfrac{x^6y^3\cdot(x^5y)^2}{x^{-4}y^{12}}\right)^3$

(d) $\left(\dfrac{x^{r+s}}{x^{2r+5}}\right)^4$

(e) $(xy)^{-n}\cdot\dfrac{x^{n-1}y^{m-1}}{x^{2n}y^n}$