

MATH 141: Quiz 1

Name: Key

Directions:

- * Show your thought process (commonly said as "show your work") when solving each problem for full credit.
- * If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- * Good luck!

1. Simplify the following:

(a) $\frac{(x+1)^2(x+2)}{(x+2)^{-2}(x+1)^3(x+3)}$ $\xrightarrow{\text{L.O.E (2)}} \frac{(x+1)^{2-3} \cdot (x+2)^{1-(-2)}}{(x+3)} = \frac{(x+1)^{-1} \cdot (x+2)^3}{(x+3)}$

all global factors, use L.O.E

$\xrightarrow{\text{L.O.E (2)}} \frac{(x+2)^3}{(x+1)(x+3)}$

(b) $\left(\frac{x^6 y^{-3}}{(x-1)(x+2)^2 x} \right)^{-1/2}$ $\xrightarrow{\text{L.O.E (6)}} \frac{((x-1)(x+2)^2 x)^{\frac{1}{2}}}{(x^6 y^{-3})^{\frac{1}{2}}}$

all factors, use L.O.E

$\xrightarrow{\text{L.O.E (4)}} \frac{(x-1)^{\frac{1}{2}} \cdot ((x+2)^2)^{\frac{1}{2}} \cdot x^{\frac{1}{2}}}{(x^6)^{\frac{1}{2}} \cdot (y^{-3})^{\frac{1}{2}}}$

$\xrightarrow{\text{L.O.E (3)}} \frac{(x-1)^{\frac{1}{2}} \cdot (x+2) \cdot x^{\frac{1}{2}}}{x^3 \cdot y^{-\frac{3}{2}}}$

$\rightarrow \frac{1}{2} - 3 = \frac{1}{2} - \frac{6}{2} = -\frac{5}{2}$

$\xrightarrow{\text{L.O.E (2)}} \frac{(x-1)^{\frac{1}{2}} (x+2) x^{-\frac{5}{2}}}{y^{-\frac{5}{2}}} \xrightarrow{\text{L.O.E (2)}} \frac{(x-1)^{\frac{1}{2}} (x+2) y^{\frac{5}{2}}}{x^{\frac{5}{2}}}$

$\frac{(x-1)^{\frac{1}{2}} (x+2) y^{\frac{5}{2}}}{x^{\frac{5}{2}}}$

2. Can I cancel the x in

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

Why or why not?

No, in the global context x is a factor in the numerator.

But the global context of the denominator comprises of terms. x is only a factor in the context of $3x^2(x-1)$.

Fraction law 5 describes the only time you can cancel and why:

$$\frac{a \cdot c}{b \cdot c} = \frac{a}{b}$$

In this case, in the global context of both the numerator and denominator, c is a factor!