Quiz 3

Show all your world

Show all your work algebraically for each. No credit is given without supporting work. There are two sides to this quiz.

- 1. Let $s(x) = \frac{1}{x}$.
 - (a) [2] (§2.5 #9) Write down the rule of (3s 2s)(x) = 3s(x) 3s(x) + 3s(x) = 3s(x) + 3s(x

stacted (+,5)

$$\frac{3}{x} - \frac{1}{2} = \frac{3}{x} - \frac{1}{x} = \frac{x}{x}$$

(b) [2] (§2.5 #21) Write down the rule of

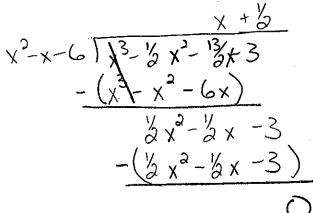
 $\frac{s(3+x)-s(3)}{x} = \frac{3}{3} \frac{1}{3+x} - \frac{1}{3} \frac{3+y}{3+y}$ $= \frac{3-(3+x)}{3(3+x)} + \frac{x}{1}$ $= \frac{-x}{3(3+x)} \cdot \frac{1}{x} = \frac{-1}{3(3+x)}$

(c) [1] (§2.5 #21) Simplify the rule in (b) as much as possible.

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Something to watch for: the expression in (1b) is known as the "difference quotient at 3" of the function s and dominates first quarter calculus.

- 2. Let $m(x) = x^3 \frac{1}{2}x^2 \frac{13}{2}x 3$ and $n(x) = x^2 x 6$.
 - (a) [3] (§2.5 #31) Use long division to write $\frac{m}{n}(x)$ as a 'mixed rational function'. Or more accurately, write $\frac{m}{n}(x)$ as an expression in the form $G(x) + \frac{R(x)}{n(x)}$, where G and R are polynomials with deg(R) < deg(n).



set op (5) algorithm (+1) signs (+5) got it (+,5)

$$\frac{\chi^{3} - 3 \chi^{2} - \frac{13}{3} \chi - 3}{\chi^{2} - \chi - 6} = \chi + 3 + \frac{0}{\chi^{2} - \chi - 6}$$

(b) [1] Use the above result to factor m completely.

$$x^{3}-3x^{2}-13x-3=(x+3)(x^{2}-x-6)$$
 (+5)
= $(x+3)(x-3)(x+2)$ (+5)

(c) [1] Find the roots of m.

100% happen when m(x) =0(3.5)

$$0 = x^3 - 5x^2 - 135x - 3 = (x+5)(x-3)(x+2)$$

$$(2 \times 3)$$