

M242 Q5(b) (S. Zhang) (8 points). Name: _____

1. Find

$$\int \frac{2x^2 - 7x + 7}{(x-1)(x-2)^2} dx$$

• **ans:** Partial fractions:

$$\frac{A}{x-1} + \frac{B}{x-2} + \frac{C}{(x-2)^2}$$

$$2x^2 - 7x + 7 = A(x-2)^2 + B(x-1)(x-2) + Cx - 1$$

$$x = 1, 2(1) - 7 + 7 = A, A = 2$$

$$x = 2, 2(4) - 7(2) + 7 = C(1), C = 1$$

$$x = 0, 7 = 4A + 2B - C, 2B = 7 - 4A + C = 0$$

$$\begin{aligned} \int \frac{2x^2 - 7x + 7}{(x-1)(x-2)^2} dx &= \int \frac{2}{x-1} dx + \int \frac{1}{(x-2)^2} dx \\ &= 2 \ln |x-1| - (x-2)^{-1} + C \end{aligned}$$