Quiz 3 (sample)

Name: _____ Each question is worth ten marks.

Evaluate each of the following indefinite integrals. Don't waste time writing any constants of integration.

1. $\displaystyle\int \frac{x^2 - x + 3}{(x+1)(x-1)(x-2)}\,dx$

2. $\displaystyle\int \frac{3x - 4}{(x+2)^2(x-1)}\,dx$

Quiz 3 (sample), with solutions

Evaluate each of the following indefinite integrals. Don't waste time writing any constants of integration.

1. $$\int \frac{x^2-x+3}{(x+1)(x-1)(x-2)}\,dx = \int \left\{ \frac{\overset{①}{5}}{6(x+1)} - \frac{\overset{②}{3}}{2(x-1)} + \frac{\overset{③}{5}}{3(x-2)} \right\} dx = \tfrac{1}{6}\log\left|\frac{(x+1)^5(x-2)^{10}}{(x-1)^9}\right|.$$

Covering and evaluating gives:
① $= \dfrac{1+1+3}{(-2)\cdot(-3)} = \frac{5}{6}$;
② $= \dfrac{1-1-3}{2\cdot(-1)} = -\frac{3}{2}$;
③ $= \dfrac{4-2+3}{3\cdot 1} = \frac{5}{3}$.

2. $$\int \frac{3x-4}{(x+2)^2(x-1)}\,dx = \int \left\{ \frac{\overset{③}{1}}{9(x+2)} + \frac{\overset{①}{10}}{3(x+2)^2} - \frac{\overset{②}{1}}{9(x-1)} \right\} dx = -\frac{10}{3(x+2)} + \tfrac{1}{9}\log\left|\frac{x+2}{x-1}\right|.$$

Covering and evaluating gives:
① $= \dfrac{-6-4}{-2-1} = \frac{10}{3}$;
② $= \dfrac{3-4}{3^2} = -\frac{1}{9}$.
Comparing quadratic coefficients gives: ③ $-\frac{1}{9} = 0$.