Work carefully and neatly. You must show all relevant work! You may receive no credit if there is insufficient work.

[4pt] 1. Evaluate and simplify the following expressions:

a) $\dfrac{(5^2)^3}{5^{-3}(5^5)}$

b) $8^{2/3}(2^3)$

$= \dfrac{5^6}{5^{-3+5}} = \dfrac{5^6}{5^2} =$

$= (8^{1/3})^2 2^3 = (2)^2 2^3$

$5^4 = 5^3 \cdot 5 = 125 \cdot 5 = 625$

$= 2^{2+3} = 2^5$

[2pt] 2. Find all x that satisfy the equation $2x^2 - 5x + 3 = 0$.

$2x^2 - 5x + 3 = (2x - 3)(x - 1) = 0$. So either $2x - 3 = 0$ or $x - 1 = 0$. Hence either $x = 3/2$ or $x = 1$.

[2pt] 3. If $f(x) = \dfrac{x^2 - 1}{x + 2}$, evaluate $f(3)$.

$f(3) = \dfrac{3^2 - 1}{3 + 2} = \dfrac{8}{5}$

[2pt] 4. If $f(x) = x^2 + 1$ and $g(x) = \dfrac{2}{2x + 1}$, find $g \circ f(x)$.

$g \circ f(x) = g(f(x)) = g(x^2 + 1) = \dfrac{2}{2(x^2 + 1) + 1} = \dfrac{2}{2x^2 + 3}$