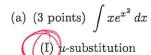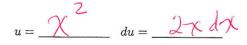1. Multiple choice: for each of the following integrals, **circle a single method of integration** that will work. Then fill in the relevant information for **just** that method.

(a) (3 points) $\int xe^{x^2}\, dx$

    (I) *u*-substitution $u = \underline{\ x^2\ }$ $du = \underline{\ 2x\,dx\ }$

    (II) integration by parts $u = \underline{\qquad}$ $dv = \underline{\qquad}$

    (III) trigonometric substitution $x = \underline{\qquad}$ $dx = \underline{\qquad}$

    (IV) partial fraction decomposition   Form of decomposition: $\underline{\qquad\qquad\qquad}$

(b) (3 points) $\int \dfrac{3x}{x^2 - 5x - 6}\, dx \;=\; \int \dfrac{3x}{(x-6)(x+1)}\, dx$

    (I) *u*-substitution $u = \underline{\qquad}$ $du = \underline{\qquad}$

    (II) integration by parts $u = \underline{\qquad}$ $dv = \underline{\qquad}$

    (III) trigonometric substitution $x = \underline{\qquad}$ $dx = \underline{\qquad}$

    (IV) partial fraction decomposition   Form of decomposition: $\dfrac{A}{x-6} + \dfrac{B}{x+1}$