

Q3 a)

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① iv)

$$\int_2^4 (2x+3)(x+5) dx$$

$$\int_2^4 2x^2 + 13x + 15 dx$$

$$\left[\frac{2}{3}x^3 + \frac{13}{2}x^2 + 15x \right]_2^4$$

$$= \frac{620}{3} - \frac{184}{3}$$

$$= \boxed{\frac{436}{3}}$$

ii)

$$(3x^3 + 2x)^3 (3x^3 + 2x) (3x^3 + 2x)$$

$$(9x^6 + 6x^4 + 6x^4 + 4x^2) (3x^3 + 2x)$$

$$(9x^6 + 12x^4 + 4x^2) (3x^3 + 2x)$$

$$27x^9 + 18x^7 + 36x^5 + 24x^5 + 12x^3 + 8x^3$$

$$= \int 27x^9 + 54x^7 + 36x^5 + 8x^3 dx$$

$$\left[\frac{27}{10}x^{10} + \frac{54}{8}x^8 + \frac{36}{6}x^6 + \frac{8}{4}x^4 \right]_0^2$$

$$\left[\frac{27}{10}x^{10} + \frac{27}{4}x^8 + 6x^6 + 2x^4 \right]_0^2$$

$$\frac{24544}{5} - 0$$

$$= \frac{24544}{5} = 4908.8$$