

1.3.19 c)

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$$f(x) - g(x) = x^3 - 5x^2 + 6x - (x^3 - 7x^2 + 12x)$$

$$= \cancel{x^3} - 5x^2 + 6x - \cancel{x^3} + 7x^2 - 12x = 2x^2 - 6x$$

$$f(x) - g(x) = 0 \Leftrightarrow 2x(x-3) = 0 \Leftrightarrow \begin{matrix} x=0 \\ x=3 \end{matrix}$$

$$\Rightarrow A = \left| \int_0^3 (f(x) - g(x)) dx \right|$$

$$= \left| \int_0^3 (2x^2 - 6x) dx \right| = \left| \left(\frac{2}{3} x^3 - 3x^2 \right) \Big|_0^3 \right|$$

$$= \left| \frac{2}{3} \cdot 27 - 3 \cdot 9 - (0 - 0) \right| = |18 - 27|$$

$$= |-9| = 9$$

1.3.19 d)

3MS

$$\begin{aligned} f(x) - g(x) &= x \cdot (6 - 2x^2) - x \cdot (2 - x^2) \\ &= x \cdot (6 - 2x^2 - (2 - x^2)) = x \cdot (6 - 2x^2 - 2 + x^2) \\ &= x(4 - x^2) = x(2 - x)(2 + x) \end{aligned}$$

$$f(x) - g(x) = 0 \Leftrightarrow x = 0 / x = 2 / x = -2$$

$$\Rightarrow A = \left| \int_{-2}^0 (f(x) - g(x)) dx \right| + \left| \int_0^2 (f(x) - g(x)) dx \right|$$

$$\begin{aligned} \int (f(x) - g(x)) dx &= \int x(4 - x^2) dx = \int (4x - x^3) dx \\ &= 2x^2 - \frac{1}{4}x^4 + C \end{aligned}$$

$$\left(2x^2 - \frac{1}{4}x^4 \right) \Big|_{-2}^0 = (0 - 0) - \left(2 \cdot (-2)^2 - \frac{1}{4}(-2)^4 \right)$$

$$= -\left(8 - \frac{1}{4} \cdot 16 \right) = -(8 - 4) = -4$$

1.3.19 d)

3MS

$$\left(2x^2 - \frac{1}{4}x^4\right) \Big|_0^2 = \left(2 \cdot 2^2 - \frac{1}{4}2^4\right) - (0 - 0)$$

$$= \left(2 \cdot 4 - \frac{1}{4}16\right) = 8 - 4 = 4$$

$$\Rightarrow A = |-4| + |4|$$

$$= 4 + 4 = 8$$