1 (a) $\int_{-1}^{2}(7-3x)\,dx = 7x-\frac{3}{2}x^2\Big|_{-1}^{2} = (14-6)-(-7-\frac{3}{2}) = 8+\frac{17}{2} = \frac{33}{2} = 16.5$ #

(b) $\int_0^5 |2x-5|\,dx = \int_0^{\frac{5}{2}} -(2x-5)\,dx + \int_{\frac{5}{2}}^5 2x-5\,dx = -x^2+5x\Big|_0^{\frac{5}{2}} + x^2-5x\Big|_{\frac{5}{2}}^5 = \left[(-\frac{25}{4}+\frac{25}{2})-0\right]+\left[0-(\frac{25}{4}-\frac{25}{2})\right]$

$= \frac{25}{4}+\frac{25}{4} = \frac{25}{2}$ #

2. $-x^4+2x^3+5x^2-6x = -x(x+2)(x-1)(x-3)$ $\quad x = -2, 0, 1, 3$

$A_1+A_2 = \int_{-2}^{0} -x^4+2x^3+5x^2-6x\,dx + \int_1^3 -x^4+2x^3+5x^2-6x\,dx$

$= \left[-\frac{x^5}{5}+\frac{x^4}{2}+\frac{5}{3}x^3-3x^2\right]_{-2}^{0} + \left[-\frac{x^5}{5}+\frac{x^4}{2}+\frac{5}{3}x^3-3x^2\right]_1^3$

$= \left[0-(\frac{32}{5}+8-\frac{40}{3}-12)\right]+\left[(-\frac{243}{5}+\frac{81}{2}+\frac{135}{3}-27)-(-\frac{1}{5}+\frac{1}{2}+\frac{5}{3}-3)\right]$

$= \left[0-(-\frac{164}{15})\right]+\left[(\frac{297}{30}-(-\frac{31}{30}))\right] = \frac{164}{15}+\frac{164}{15} = \frac{328}{15} \approx 21.86667$ #

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(a) $\int_1^2 x^3\sqrt{x^4+5}\,dx$ $\quad$ 令 $u = x^4+5$, $du = 4x^3\,dx$

$= \frac{1}{4}\int_6^{21}\sqrt{u}\,du = \frac{1}{4}\left[\frac{2}{3}\sqrt{u^3}\right]_6^{21} = \frac{1}{6}(\sqrt{21^3}-\sqrt{6^3}) \approx 13.589$ #

(b) $\int_0^{15} x\sin(\frac{-x^2}{2})\,dx$ $\quad$ 令 $u = \frac{-x^2}{2}$, $du = -x\,dx$

$= -\int_0^{-112.5}\sin(u)\,du = \cos u\Big|_0^{-112.5} = \cos(-112.5)-1 \approx -0.193$ #