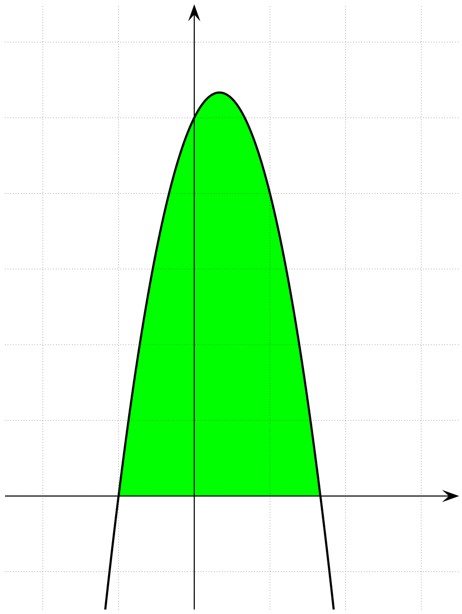
11.5 1) Résolvons $f(x) = -3\,x^2 + 2\,x + 5 = 0$:

$\Delta = 2^2 - 4 \cdot (-3) \cdot 5 = 64 = 8^2$

$x_1 = \frac{-2+8}{2\cdot(-3)} = -1 \qquad x_2 = \frac{-2-8}{2\cdot(-3)} = \frac{5}{3}$

		-1		$\frac{5}{3}$	
f	$-$		$+$		$-$



$$\int_{-1}^{\frac{5}{3}} (-3\,x^2 + 2\,x + 5)\,dx = -x^3 + x^2 + 5\,x \Big|_{-1}^{\frac{5}{3}} =$$

$$\Big(-(\tfrac{5}{3})^3 + (\tfrac{5}{3})^2 + 5 \cdot \tfrac{5}{3}\Big) - \Big(-(-1)^3 + (-1)^2 + 5 \cdot (-1)\Big) =$$

$$\Big(-\tfrac{125}{27} + \tfrac{25}{9} + \tfrac{25}{3}\Big) - \Big(1 + 1 - 5\Big) = \tfrac{175}{27} - (-3) = \tfrac{256}{27}$$

2) $f(x) = 2\,x^2 - x^3 - x^4 = -x^2\,(x^2 + x - 2) = -x^2\,(x+2)\,(x-1)$

		-2		0		1	
-1	$-$		$-$		$-$		$-$
x^2	$+$		$+$	0	$+$		$+$
$x+2$	$-$	0	$+$		$+$		$+$
$x-1$	$-$		$-$		$-$	0	$+$
f	$-$	0	$+$	0	$+$	0	$-$

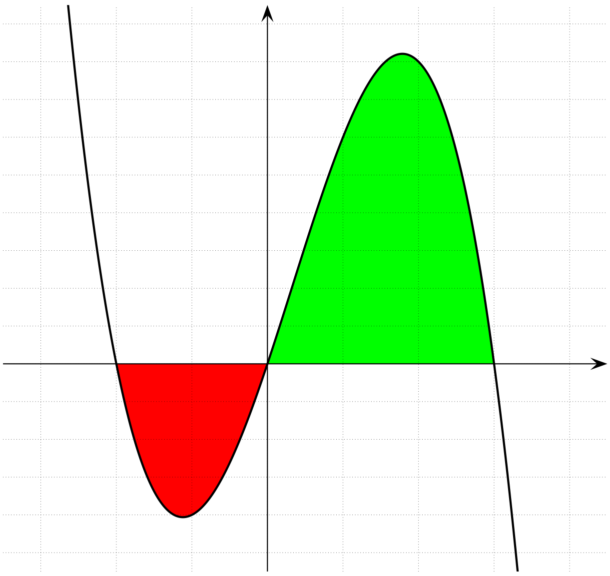
$$\int_{-2}^{1}(2\,x^2 - x^3 - x^4)\,dx = \tfrac{2}{3}\,x^3 - \tfrac{1}{4}\,x^4 - \tfrac{1}{5}\,x^5\,\Big|_{-2}^{1} =$$

$$\left(\tfrac{2}{3}\cdot 1^3 - \tfrac{1}{4}\cdot 1^4 - \tfrac{1}{5}\cdot 1^5\right) - \left(\tfrac{2}{3}\cdot(-2)^3 - \tfrac{1}{4}\cdot(-2)^4 - \tfrac{1}{5}\cdot(-2)^5\right) =$$

$$\left(\tfrac{2}{3} - \tfrac{1}{4} - \tfrac{1}{5}\right) - \left(-\tfrac{16}{3} - 4 + \tfrac{32}{5}\right) = \tfrac{13}{60} - \left(-\tfrac{44}{15}\right) = \tfrac{63}{20}$$

3) $f(x) = 6\,x + x^2 - x^3 = -x\,(x^2 - x - 6) = -x\,(x+2)\,(x-3)$

		-2		0		3	
$-x$	$+$		$+$	0	$-$		$-$
$x+2$	$-$	0	$+$		$+$		$+$
$x-3$	$-$		$-$		$-$	0	$+$
f	$+$	0	$-$	0	$+$	0	$-$



$$-\int_{-2}^{0}(6\,x + x^2 - x^3)\,dx + \int_{0}^{3}(6\,x + x^2 - x^3)\,dx =$$

$$-\left(3\,x^2 + \tfrac{1}{3}\,x^3 - \tfrac{1}{4}\,x^4\,\Big|_{-2}^{0}\right) + \left(3\,x^2 + \tfrac{1}{3}\,x^3 - \tfrac{1}{4}\,x^4\,\Big|_{0}^{3}\right) =$$

$$-\Big(\big(3\cdot 0+\tfrac{1}{3}\cdot 0^3-\tfrac{1}{4}\cdot 0^4\big)-\big(3\cdot(-2)^2+\tfrac{1}{3}\cdot(-2)^3-\tfrac{1}{4}\cdot(-2)^4\big)\Big)$$
$$+\Big(\big(3\cdot 3^2+\tfrac{1}{3}\cdot 3^3-\tfrac{1}{4}\cdot 3^4\big)-\big(3\cdot 0+\tfrac{1}{3}\cdot 0^3-\tfrac{1}{4}\cdot 0^4\big)\Big)=$$
$$-\big((0+0-0)-(12-\tfrac{8}{3}-4)\big)+\big((27+9-\tfrac{81}{4})-(0+0-0)\big)=$$
$$-(0-\tfrac{16}{3})+(\tfrac{63}{4}-0)=-(-\tfrac{16}{3})+\tfrac{63}{4}=\tfrac{253}{12}$$