Q(4)

Before we proceed, it is wise to calculate some addiional integrals:

$$\int_{-1}^{4}(f(x))dx = \int_{-1}^{2} f(x)dx + \int_{2}^{4} f(x)dx = 4 + 6 = 10$$

$$2\int_{-1}^{4} g(x)dx = 10 - 20 = -10 \implies \int_{-1}^{4} g(x)dx = -5$$

$$u = 2x \;:\; du = 2dx, \;\; dx = \frac{1}{2}du$$

$$\frac{1}{2}\int_{u(1)}^{u(2)} g(u)du = 12$$

$$\int_{2}^{4} g(x)dx = 24$$

(a)

$$\int_{-1}^{2} g(x)dx = -5 - 24 = -29$$

(b)

$$u = 2x \;:\; du = 2dx, \;\; dx = \frac{1}{2}du$$

$$\frac{1}{2}\int_{u(1)}^{u(2)} f(u)du = \frac{1}{2}\int_{2}^{4} f(x)dx$$

$$= 3$$

(c)

$$3\int_{2}^{4} f(x)dx + 2\int_{2}^{4} g(x)dx = 18 + 48 + 66$$