$$\int \frac{x-1}{x^2-2x+2}\,dx$$

Substitution:

$$u = x^2 - 2x - 2$$
$$\frac{du}{dx} = 2x - 2 = 2(x-1)$$
$$du = 2(x-1)dx$$
$$\frac{du}{2} = (x-1)dx$$

$$\int \frac{x-1}{x^2-2x+2}dx = \frac{1}{2}\int \frac{1}{u}du = \frac{1}{2}\ln|u| = \frac{1}{2}\ln|x^2-2x+2|$$

$$\int 2xe^{x^2}\,dx$$

Substitution:

$$u = x^2$$
$$\frac{du}{dx} = 2x$$
$$du = 2xdx$$

$$\int 2xe^{x^2}\,dx = \int e^{x^2}\cdot 2x\,dx = \int e^u\,du = e^u = e^{x^2}$$