1. (4 points) Determine the exact value of $\int_{-2}^{6} f(x) \, dx$ for each problem.
2. (6 points) Determine the exact value of the total shaded area for each problem.

\[ f(x) = x^2 - 5 \]

\[ y = x^2 - 10x + 30 \]

\[ y = 2x + 3 \]

\[ y = -2x + 6 \]