Answers

1. Notice the roots of the equation are −1 and 3, which are both in the interval. Since our graph is a quadratic and opens up, the graph will fall below the axis from −1 to 3. We need to take that into account when calculating the definite integral.

$$\int_{-2}^{-1}(x^2-2x-3)\,dx-\int_{-1}^{3}(x^2-2x-3)\,dx+\int_{3}^{5}(x^2-2x-3)\,dx$$

$$\frac{7}{3} \quad - \quad \left(-\frac{32}{3}\right) \quad + \quad \frac{32}{3}$$

$$\frac{71}{3}$$

Or, we can do the absolute value on the calculator:

$$\int_{-2}^{5}\left|x^2-2x-3\right|dx \approx 23.666$$

2. $\Delta x = \dfrac{2-0}{4} = \dfrac{1}{2}$

$$
\begin{aligned}
M &= \frac{1}{2}\left[f\left(\frac{1}{4}\right) + f\left(\frac{3}{4}\right) + f\left(\frac{5}{4}\right) + f\left(\frac{7}{4}\right)\right] \\
&= \frac{1}{2}\left[\frac{65}{64} + \frac{91}{64} + \frac{189}{64} + \frac{407}{64}\right] \\
&= \frac{1}{2}\left[\frac{752}{64}\right] \\
&= \frac{47}{8}
\end{aligned}
$$