1.1 ***A*** *Find the sum of 34 and 126 using a calculator.*

$$34 + 126 = 160$$

B *Find the same sum using long addition.*

$$\begin{array}{cccc} & & 1 & \\ & & 3 & 4 \\ + & 1 & 2 & 6 \\ \hline & 1 & 6 & 0 \end{array}$$

1.2 *Evaluate the following definite integral:*

$$\int_0^3 \sqrt{x^2+4}dx$$

$$u = x^2 + 4 \quad du = 2x$$

$$\Rightarrow \quad \int_{0^2+4}^{3^2+4} \sqrt{u}du = \frac{1}{2}u^{-\frac{1}{2}}\Big|_4^{13}$$

$$\frac{1}{2\sqrt{13}} - \frac{1}{2\sqrt{4}} \approx -0.113$$

2.1 ***A*** *Find the roots of the quadratic equation $y = x^2+2x-3$ using the quadratic formula.*

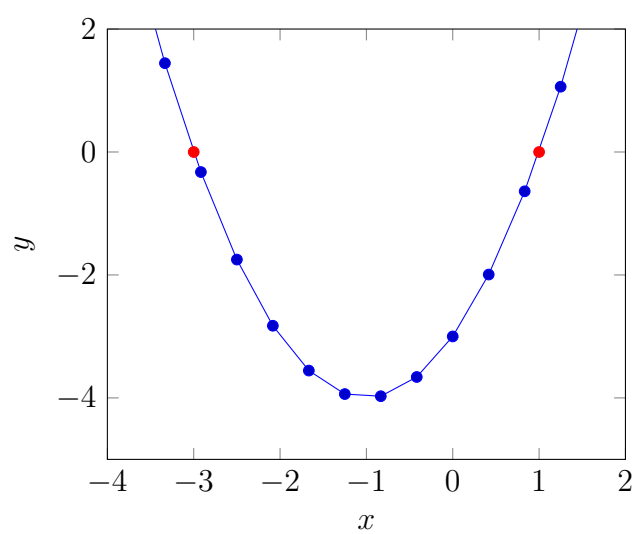
$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} \tag{1}$$

$$a = 1, b = 2, c = -3 \tag{2}$$

$$x = \frac{-2 \pm \sqrt{16}}{2} \tag{3}$$

$$x = 1, -3 \tag{4}$$

B *Graph the same equation to verify those points.*



2.3 *A particle's location is* $(1, 4, 7)$ *at* $t = 0$ *and its velocity is given by* $\vec{v}(t) = (4t + 3)\hat{i} + (2t)\hat{j} + (6t + 1)\hat{k}$. *Find the particle's location as a function of time, and evaluate for* $t = 6$.

Let $\vec{p} = (1, 4, 7)$ at $t = 0$

$$\frac{d\vec{r}}{dt} = \vec{v}(t)$$
$$d\vec{r} = \vec{v}(t)dt$$
$$\int d\vec{r} = \int \vec{v}(t)dt$$
$$\vec{r}(t) = \int (4t + 3)\hat{i} + (2t)\hat{j} + (6t + 1)\hat{k}dt$$

$\vec{r}(t) = (2t^2 + 3t)\hat{i} + (t^2)\hat{j} + (3t^2 + t)\hat{k} + \vec{C}$, where $\vec{C}$ is a constant vector.

When $t = 0$, $\vec{C} = \vec{p} = (1, 4, 7)$.

$$\Rightarrow \quad \vec{r}(t) = 91\hat{i} + 40\hat{j} + 121\hat{k}$$