

Problem Set 0

The purpose of this problem set is to become familiar with the use of Maple, Mathematica, or Wolfram Alpha as a tool for analyzing mathematically complex problems. Choose one of the tools to visualize and solve the following problems.

1. Numerically find the values of x which satisfy the following equation.

$$\left[\begin{array}{l} > x^3 - x^2 = 7 \\ & x^3 - x^2 = 7 \end{array} \right. \quad (1)$$

Use graphics to help visualize the problem.

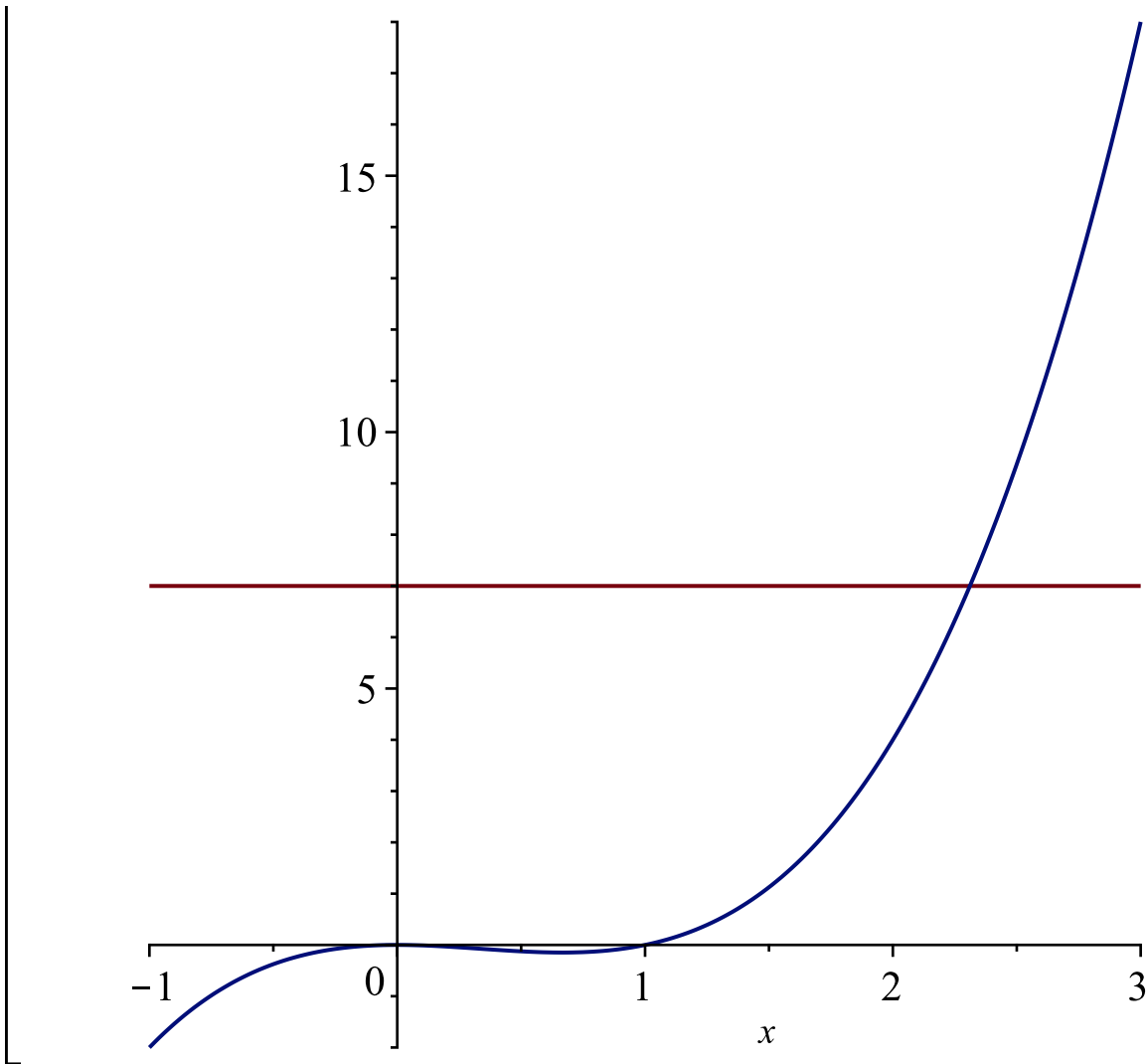
2. Find the following integral as a function of x .

$$\left[\begin{array}{l} > g := x \rightarrow \text{int}(\exp(-s^2), s = 0 .. x) \\ & g := x \mapsto \int_0^x e^{-s^2} ds \end{array} \right. \quad (2)$$

Use graphics to help you visualize the integrand and the integral.

1.

$$\left[\begin{array}{l} > \text{plot}(\{x^3 - x^2, 7\}, x = -1 .. 3); \end{array} \right.$$



```
[> fsolve(x3 - x2 = 7, x = 2.5)
2.310852163 (3)
```

Here we see that there is one solution for the equation which is $x=2.310852163$

2. We can use maple to evaluate the integral

```
[> g := x -> int(exp(-s2), s = 0..x)
g := x -> ∫0x e-s2 ds (4)
```

```
[> g(x)
√π erf(x) / 2 (5)
```

```
plot({exp(-u2), g(u)}, u = 0..3)
```

