

Assignment 1: Solutions

Problem 3.

```
> n:=123456789;
                                n := 123456789
> nextprime(n^5);
                                28679718602997181072337614380936720483079
```

Problem 4.

```
> a := 2063; b := 1297;
                                a := 2063
                                b := 1297
> r[0] := a: s[0] := 1: t[0] := 0:
> r[1] := b: s[1] := 0: t[1] := 1: n := 1:
> while r[n] <> 0 do n := n + 1:
> q[n] := floor(r[n-2]/r[n-1]):
> r[n] := r[n-2] - q[n]*r[n-1]:
> s[n] := s[n-2] - q[n]*s[n-1]:
> t[n] := t[n-2] - q[n]*t[n-1]: od:
> igcdex(a,b,'x','y'): x: y:
> A := array(0..n,1..6):
> q[0] := '***':
> q[1] := '***':
> Digits := 8:
> for k from 0 to n do
> A[k,1] := k:
> A[k,2] := q[k]:
> A[k,3] := r[k]:
> A[k,4] := s[k]:
> A[k,5] := t[k]:
> if t[k] = 0 then A[k,6] := '***'
> else A[k,6] := evalf(-s[k]/t[k]) fi:
> od:
> convert(A,matrix);
```

$$\begin{bmatrix} 0 & *** & 2063 & 1 & 0 & *** \\ 1 & *** & 1297 & 0 & 1 & 0. \\ 2 & 1 & 766 & 1 & -1 & 1. \\ 3 & 1 & 531 & -1 & 2 & .50000000 \\ 4 & 1 & 235 & 2 & -3 & .66666667 \\ 5 & 2 & 61 & -5 & 8 & .62500000 \\ 6 & 3 & 52 & 17 & -27 & .62962963 \\ 7 & 1 & 9 & -22 & 35 & .62857143 \\ 8 & 5 & 7 & 127 & -202 & .62871287 \\ 9 & 1 & 2 & -149 & 237 & .62869198 \\ 10 & 3 & 1 & 574 & -913 & .62869660 \\ 11 & 2 & 0 & -1297 & 2063 & .62869607 \end{bmatrix}$$