

## > **Math 211 : MAPLE Homework Solution #5 -- *Your NAME***

**Problem 6(a) : Using Maple's power mod command:**

```
> Power(12345, 123456789) mod 7777;  
4327 (1)
```

Thus, MAPLE found that  $\text{rem}(12345^{123456789}, 7777) = 4327$ .

If we try to compute this in the naive way, then we either get an overflow error or the computation takes a long time.

```
> irem(12345123456789, 7777);  
4327 (2)
```

The reason for this is that MAPLE first tries to compute  $12345^{123456789}$ , which is a gigantic number. Thus, the first method is clearly better.

**Problem 6(b) : Find the binary expansion of a number n:**

```
> convert(500, binary); convert(500, base, 2);  
111110100  
[0, 0, 1, 0, 1, 1, 1, 1, 1] (3)
```

Both forms mean that  $500 = 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^2$ . Check that this is correct:

```
> 28 + 27 + 26 + 25 + 24 + 22;  
500 (4)
```

**Note:** Using the second form and the sum command, we can also check this as follows:

```
> b := convert(500, base, 2); sum(b[i]·2i-1, i = 1 .. nops(b));  
b := [0, 0, 1, 0, 1, 1, 1, 1, 1]  
500 (5)
```

```
>
```