```
> with(numtheory):
```

First 25 primes:

```
> plist := [seq(ithprime(i),i=1..25)];
```

$$plist := [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97] \quad (1)$$

```
> i := 0;
```

$$i := 0 \quad (2)$$

Mersenne numbers (many prime):

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 1$$
$$p := 2$$
$$(3) \quad (3)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 2$$
$$p := 3$$
$$(7) \quad (4)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 3$$
$$p := 5$$
$$(31) \quad (5)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 4$$
$$p := 7$$
$$(127) \quad (6)$$

First Mersenne non-prime:

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 5$$
$$p := 11$$
$$(23)\,(89) \quad (7)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 6$$
$$p := 13$$
$$(8191) \quad (8)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 7$$
$$p := 17$$
$$(131071) \quad (9)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 8$$
$$p := 19$$
$$(524287) \quad (10)$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 9$$
$$p := 23$$

(11)

$$(47)\,(178481) \tag{11}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 10$$

$$p := 29$$

$$(233)\,(1103)\,(2089) \tag{12}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 11$$

$$p := 31$$

$$(2147483647) \tag{13}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 12$$

$$p := 37$$

$$(223)\,(616318177) \tag{14}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 13$$

$$p := 41$$

$$(164511353)\,(13367) \tag{15}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 14$$

$$p := 43$$

$$(431)\,(2099863)\,(9719) \tag{16}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 15$$

$$p := 47$$

$$(13264529)\,(2351)\,(4513) \tag{17}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 16$$

$$p := 53$$

$$(69431)\,(20394401)\,(6361) \tag{18}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 17$$

$$p := 59$$

$$(3203431780337)\,(179951) \tag{19}$$

First Mersenne omission:

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 18$$

$$p := 61$$

$$(2305843009213693951) \tag{20}$$

First Mersenne number mis-labelled as prime:

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 19$$

$$p := 67$$

$$(761838257287)\,(193707721) \tag{21}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 20$$

$$p := 71$$

$$(48544121)\,(228479)\,(212885833) \quad \textbf{(22)}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 21$$

$$p := 73$$

$$(439)\,(9361973132609)\,(2298041) \quad \textbf{(23)}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 22$$

$$p := 79$$

$$(202029703)\,(1113491139767)\,(2687) \quad \textbf{(24)}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 23$$

$$p := 83$$

$$(167)\,(57912614113275649087721) \quad \textbf{(25)}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 24$$

$$p := 89$$

$$(618970019642690137449562111) \quad \textbf{(26)}$$

```
> i := i+1; p := plist[i]; ifactor(2^p-1);
```

$$i := 25$$

$$p := 97$$

$$(13842607235828485645766393)\,(11447) \quad \textbf{(27)}$$

Fermat primes (?):

```
> j := 0;
```

$$j := 0 \quad \textbf{(28)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$0$$

$$(3)$$

$$j := 1 \quad \textbf{(29)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$1$$

$$(5)$$

$$j := 2 \quad \textbf{(30)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$2$$

$$(17)$$

$$j := 3 \quad \textbf{(31)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$3$$

$$(257)$$

$$j := 4 \quad \textbf{(32)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$4$$

$$(65537)$$

$$j := 5 \quad \textbf{(33)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$5$$

$$(641)\,(6700417)$$

$$j := 6 \quad \textbf{(34)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$6$$

$$(67280421310721)\,(274177)$$

$$j := 7 \quad \textbf{(35)}$$

```
> j; ifactor(2^(2^j)+1); j := j+1;
```

$$7$$

$$(59649589127497217)\,(5704689200685129054721)$$

$$j := 8 \quad \textbf{(36)}$$

Unsolved problem: Are there any more Fermat primes?