

```
> xgcd:=proc(a,b) local q,r0,r1,r2,x0,x1,x2,y0,y1,y2; r0:=a;
r1:=b; x0:=1; y0:=0; x1:=0; y1:=1; while r1<>0 do
q:=floor(r0/r1); r2:=r0-q*r1; x2:=x0-q*x1; y2:=y0-q*y1; r0:=r1;
r1:=r2; x0:=x1; x1:=x2; y0:=y1; y1:=y2; od; r0,x0,y0; end;
```

```
xgcd := proc(a, b)
```

```
local q, r0, r1, r2, x0, x1, x2, y0, y1, y2;
```

```
    r0 := a;
```

```
    r1 := b;
```

```
    x0 := 1;
```

```
    y0 := 0;
```

```
    x1 := 0;
```

```
    y1 := 1;
```

```
    while r1 ≠ 0 do
```

```
        q := floor(r0 / r1);
```

```
        r2 := r0 - q*r1;
```

```
        x2 := x0 - q*x1;
```

```
        y2 := y0 - q*y1;
```

```
        r0 := r1;
```

```
        r1 := r2;
```

```
        x0 := x1;
```

```
        x1 := x2;
```

```
        y0 := y1;
```

```
        y1 := y2
```

```
    od;
```

```
    r0, x0, y0
```

```
end
```

```
> debug(xgcd);
```

```
xgcd
```

```
> xgcd(13,21);
```

```
{--> enter xgcd, args = 13, 21
```

```
    r0 := 13
```

```
    r1 := 21
```

```
    x0 := 1
```

```
    y0 := 0
```

```
    x1 := 0
```

```
    y1 := 1
```

```
    q := 0
```

```
    r2 := 13
```

$x_2 := 1$
 $y_2 := 0$
 $r_0 := 21$
 $r_1 := 13$
 $x_0 := 0$
 $x_1 := 1$
 $y_0 := 1$
 $y_1 := 0$
 $q := 1$
 $r_2 := 8$
 $x_2 := -1$
 $y_2 := 1$
 $r_0 := 13$
 $r_1 := 8$
 $x_0 := 1$
 $x_1 := -1$
 $y_0 := 0$
 $y_1 := 1$
 $q := 1$
 $r_2 := 5$
 $x_2 := 2$
 $y_2 := -1$
 $r_0 := 8$
 $r_1 := 5$
 $x_0 := -1$
 $x_1 := 2$
 $y_0 := 1$
 $y_1 := -1$
 $q := 1$
 $r_2 := 3$
 $x_2 := -3$
 $y_2 := 2$
 $r_0 := 5$
 $r_1 := 3$
 $x_0 := 2$
 $x_1 := -3$
 $y_0 := -1$

y1 := 2

q := 1

r2 := 2

x2 := 5

y2 := -3

r0 := 3

r1 := 2

x0 := -3

x1 := 5

y0 := 2

y1 := -3

q := 1

r2 := 1

x2 := -8

y2 := 5

r0 := 2

r1 := 1

x0 := 5

x1 := -8

y0 := -3

y1 := 5

q := 2

r2 := 0

x2 := 21

y2 := -13

r0 := 1

r1 := 0

x0 := -8

x1 := 21

y0 := 5

y1 := -13

1, -8, 5

<-- exit xgcd (now at top level) = 1, -8, 5}

1, -8, 5

> xgcd(3*8, 3*5);

{--> enter xgcd, args = 24, 15

r0 := 24

r1 := 15

$x0 := 1$
 $y0 := 0$
 $x1 := 0$
 $y1 := 1$
 $q := 1$
 $r2 := 9$
 $x2 := 1$
 $y2 := -1$
 $r0 := 15$
 $r1 := 9$
 $x0 := 0$
 $x1 := 1$
 $y0 := 1$
 $y1 := -1$
 $q := 1$
 $r2 := 6$
 $x2 := -1$
 $y2 := 2$
 $r0 := 9$
 $r1 := 6$
 $x0 := 1$
 $x1 := -1$
 $y0 := -1$
 $y1 := 2$
 $q := 1$
 $r2 := 3$
 $x2 := 2$
 $y2 := -3$
 $r0 := 6$
 $r1 := 3$
 $x0 := -1$
 $x1 := 2$
 $y0 := 2$
 $y1 := -3$
 $q := 2$
 $r2 := 0$
 $x2 := -5$

```
y2 := 8
```

```
r0 := 3
```

```
r1 := 0
```

```
x0 := 2
```

```
x1 := -5
```

```
y0 := -3
```

```
y1 := 8
```

```
3, 2, -3
```

```
<-- exit xgcd (now at top level) = 3, 2, -3}
```

```
3, 2, -3
```