```
> 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 $r1 \neq 0$ **do**

$q := \mathrm{floor}(r0 / r1)$;

$r2 := r0 - q*r1$;

$x2 := x0 - q*x1$;

$y2 := y0 - q*y1$;

$r0 := r1$;

$r1 := r2$;

$x0 := x1$;

$x1 := x2$;

$y0 := y1$;

$y1 := y2$

od;

$r0$, $x0$, $y0$

end

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

$$xgcd$$

```
> xgcd(13,21);
{--> enter xgcd, args = 13, 21
```

$$r0 := 13$$

$$r1 := 21$$

$$x0 := 1$$

$$y0 := 0$$

$$x1 := 0$$

$$y1 := 1$$

$$q := 0$$

$$r2 := 13$$

$x2 := 1$

$y2 := 0$

$r0 := 21$

$r1 := 13$

$x0 := 0$

$x1 := 1$

$y0 := 1$

$y1 := 0$

$q := 1$

$r2 := 8$

$x2 := -1$

$y2 := 1$

$r0 := 13$

$r1 := 8$

$x0 := 1$

$x1 := -1$

$y0 := 0$

$y1 := 1$

$q := 1$

$r2 := 5$

$x2 := 2$

$y2 := -1$

$r0 := 8$

$r1 := 5$

$x0 := -1$

$x1 := 2$

$y0 := 1$

$y1 := -1$

$q := 1$

$r2 := 3$

$x2 := -3$

$y2 := 2$

$r0 := 5$

$r1 := 3$

$x0 := 2$

$x1 := -3$

$y0 := -1$

$$y1 := 2$$
$$q := 1$$
$$r2 := 2$$
$$x2 := 5$$
$$y2 := -3$$
$$r0 := 3$$
$$r1 := 2$$
$$x0 := -3$$
$$x1 := 5$$
$$y0 := 2$$
$$y1 := -3$$
$$q := 1$$
$$r2 := 1$$
$$x2 := -8$$
$$y2 := 5$$
$$r0 := 2$$
$$r1 := 1$$
$$x0 := 5$$
$$x1 := -8$$
$$y0 := -3$$
$$y1 := 5$$
$$q := 2$$
$$r2 := 0$$
$$x2 := 21$$
$$y2 := -13$$
$$r0 := 1$$
$$r1 := 0$$
$$x0 := -8$$
$$x1 := 21$$
$$y0 := 5$$
$$y1 := -13$$
$$1, -8, 5$$

```
<-- 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}
```

$$3, 2, -3$$