f(x)=x^3-6x^2 +8x .

Funktionen har to tangenter, *l* i (0,0) og m i (3,-3). Vis at *m* går gennem (0,0) og find ligningerne for tangenterne.

```
STUDENT > restart:
STUDENT > f:=x->(x^3-6*x^2+8*x);
```

$$f := x \to x^3 - 6\,x^2 + 8\,x$$

```
STUDENT > tangentlinie(l):=x->f(x0)+D(f)(x0)*(x-x0);
STUDENT > x0:=0:
STUDENT >
```

$$\text{tangentlinie}(l) := x \to \text{f}(x0) + \text{D}(f)(x0)\,(x - x0)$$

```
STUDENT > tangentlinie(m):=x->f(x1)+D(f)(x1)*(x-x1);
STUDENT > x1:=3:
STUDENT >
STUDENT >
```

$$\text{tangentlinie}(m) := x \to \text{f}(x1) + \text{D}(f)(x1)\,(x - x1)$$

```
STUDENT > f1(x):=diff(f(x),x);
```

$$\text{f1}(x) := 3\,x^2 - 12\,x + 8$$

```
STUDENT > solve(f1(x)=0,x);
```

$$2 + \frac{2}{3}\sqrt{3},\ 2 - \frac{2}{3}\sqrt{3}$$

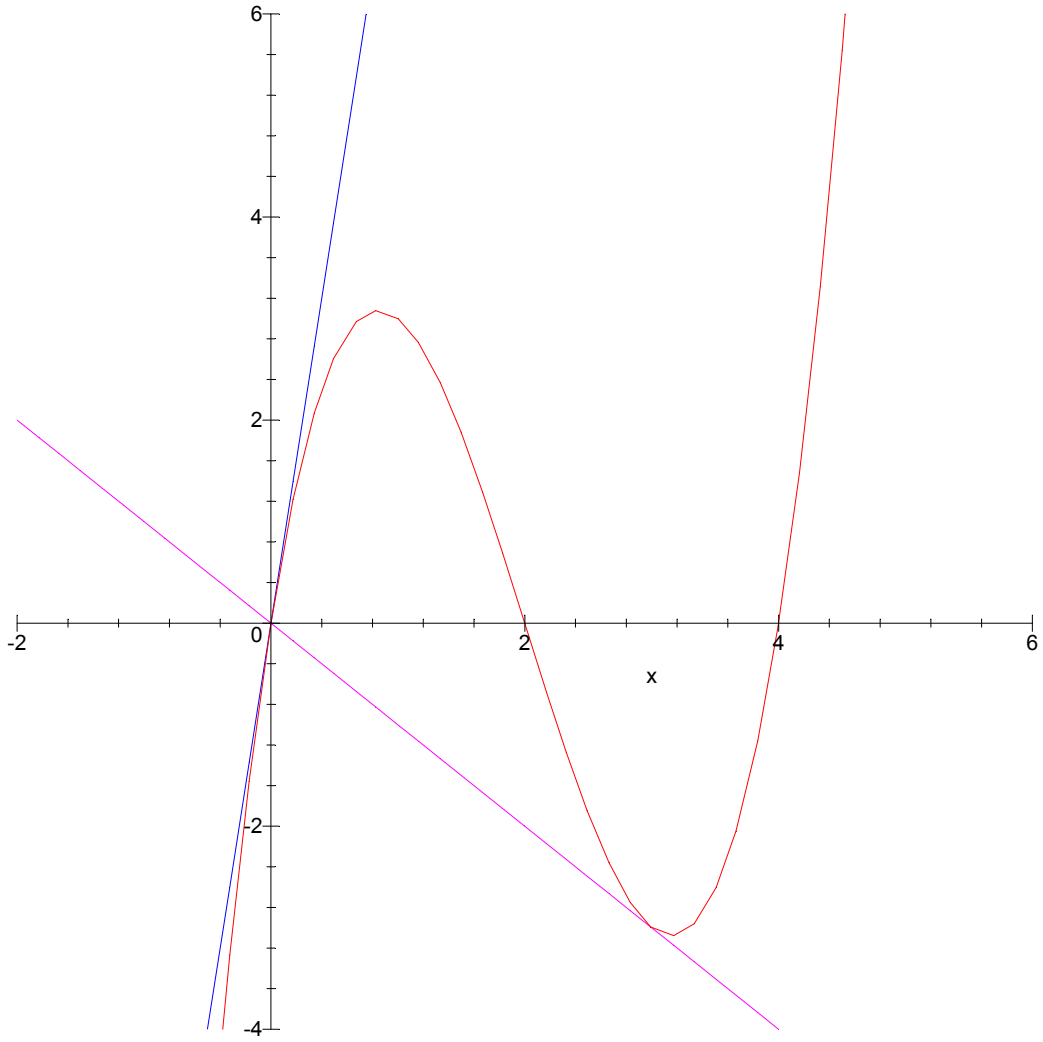
```
STUDENT > tangentlinie(l)(x);
```

$$8\,x$$

```
STUDENT > tangentlinie(m)(x);
```

$$-x$$

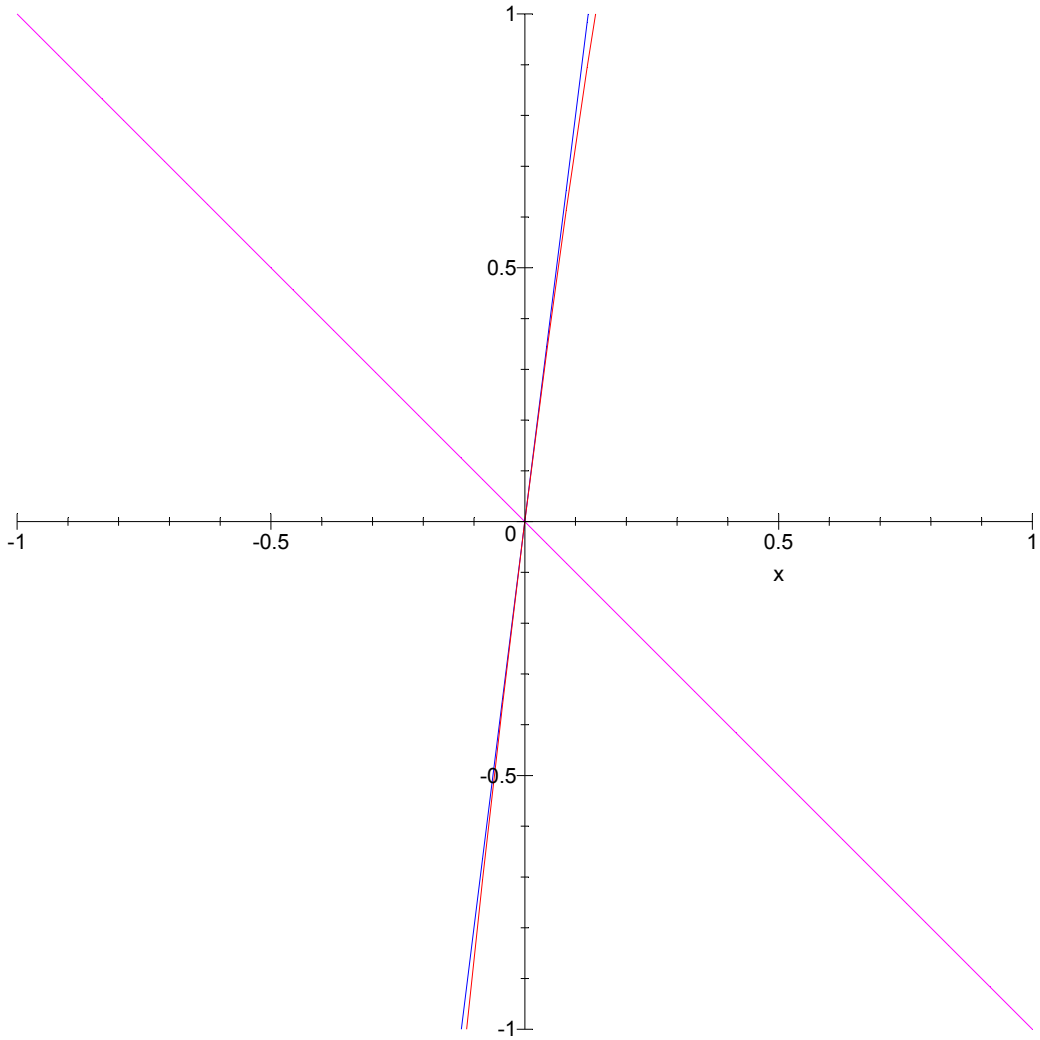
```
STUDENT > with(plots,display):
STUDENT > p1:=plot(tangentlinie(l)(x),x=-2..6,colour=blue,thicknes
          s=1):
STUDENT > p2:=plot(tangentlinie(m)(x),x=-2..6,colour=magenta,thick
          ness=1):
STUDENT > p3:=plot(f(x)  ,x=-2..6,y=-4..6,color=red,thickness=3):
STUDENT > display(p1,p2,p3);
```




```
STUDENT >
```

Zoom af f omkring (0,0). Det ses at linien *m* går gennem (0,0)

```
STUDENT > with(plots,display):
STUDENT > p1:=plot(tangentlinie(l)(x),x=-1..1,colour=blue,thicknes
          s=1):
STUDENT > p2:=plot(tangentlinie(m)(x),x=-1..1,colour=magenta,thick
          ness=1):
STUDENT > p3:=plot(f(x)  ,x=-1..1,y=-1..1,color=red,thickness=1):
STUDENT > display(p1,p2,p3);
```



Well, det er jo klart da linien *m* har forskriften -x, som jo er 0 i x = 0.