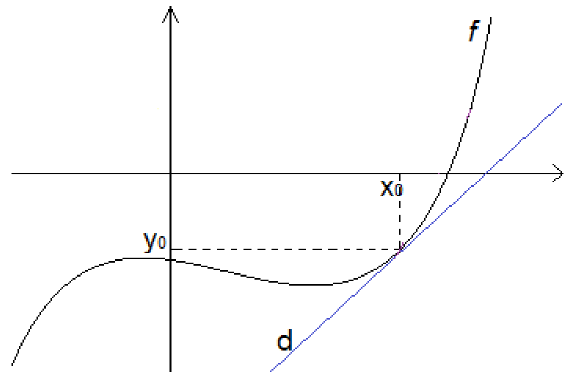
Sa se determine ecuatia tangentei la graficul functiei f(x) in punctul de abscisa x_0.

d: $y=mx+n$, $\quad m,n=?$

$y_0=f(x_0)$

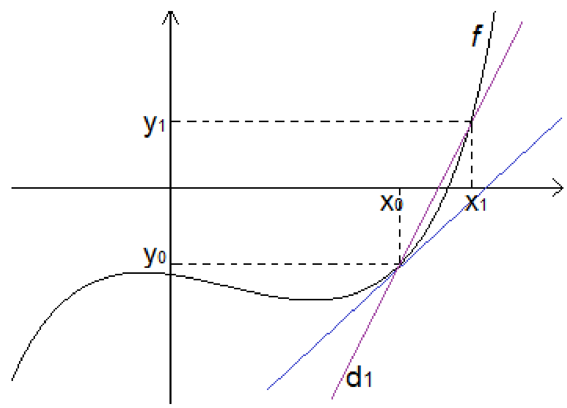
$(x_0,y_0)\in d \qquad y_0=mx_0+n$



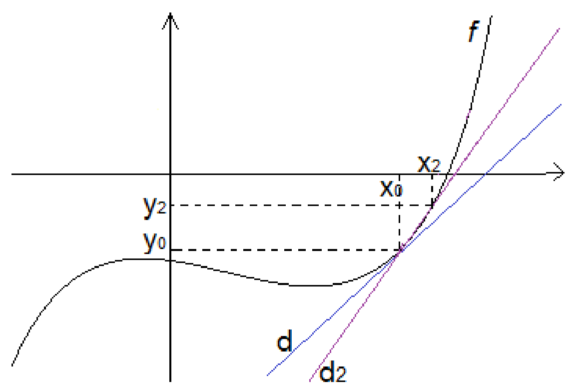
$$d_1: \frac{x-x_0}{x_1-x_0}=\frac{y-y_0}{y_1-y_0}$$

$$d_1: y=m_1x+n_1, \qquad m_1=\frac{y_1-y_0}{x_1-x_0}$$

$$m_1=\frac{f(x_1)-f(x_0)}{x_1-x_0}$$



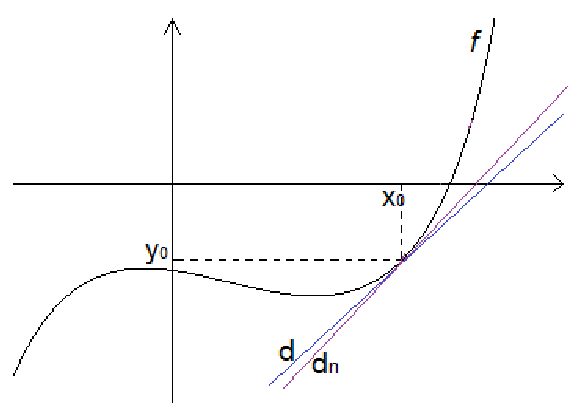
$$m_2=\frac{f(x_2)-f(x_0)}{x_2-x_0}$$



$$m_n=\frac{f(x_n)-f(x_0)}{x_n-x_0}$$

$$x_n \longrightarrow x_0$$

$$\frac{f(x_n)-f(x_0)}{x_n-x_0} \longrightarrow m$$



Daca $x_n=x_0$ *atunci* $m_n=0/0$ *(nu are sens)*

Daca fractia $\frac{f(x_n)-f(x_0)}{x_n-x_0}$ *se poate simplifica prin* x_n-x_0*, atunci* x_n *poate lua valoarea* x_0.

ex: $f(x)=x^2$

$$m_n=\frac{f(x_n)-f(x_0)}{x_n-x_0}=\frac{x_n^2-x_0^2}{x_n-x_0}=\frac{(x_n-x_0)(x_n+x_0)}{x_n-x_0}=x_n+x_0$$

Pentru $x_n=x_0$ *se obtine* $m=2x_0$

Rezultatul obtinut il notam $f'(x_0)$ *(derivata functiei in* x_0*)*

$m=f'(x_0)$

$y_0=f'(x_0)x_0+n$

$n=y_0-f'(x_0)x_0$

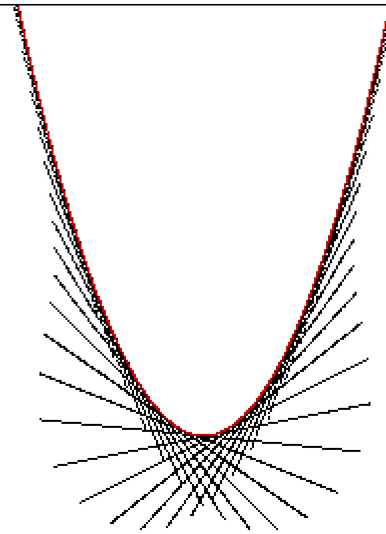
$y=f'(x_0)x+y_0-f'(x_0)x_0$

Ecuatia tangentei:

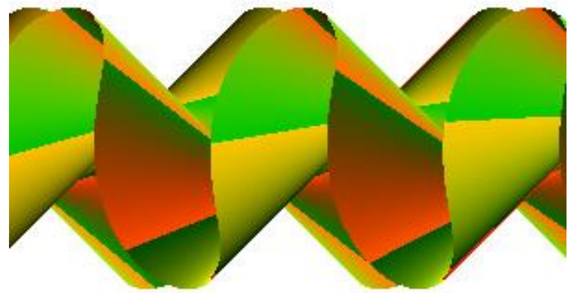
$y-y_0=f'(x_0)(x-x_0)$

<table>
<tr><td>

```
float x0,y0,d=40,cx=400,cy=250,l=2,x,y;
for(x0=-20;x0<=20;x0+=0.005)
{
    y0=x0*x0;
    pDC->SetPixel(x0*d+cx,-y0*d+cy,RGB(200,0,0));
}
for(x0=-20;x0<=20;x0+=0.15)
 for(x=-20;x<=20;x+=0.01)
 {
    y0=x0*x0;
    y=y0+2*x0*(x-x0);
    if((x-x0)*(x-x0)+(y-y0)*(y-y0)<=l*l)
    {
            pDC->SetPixel(x*d+cx,-y*d+cy,RGB(0,0,0));
    }
 }
```

</td><td></td></tr>
<tr><td>

```
float x0,y0,d=20,cx=400,cy=250,l=5,x,y;
for(x0=-20;x0<=20;x0+=0.005)
{
    y0=sin(x0);
    pDC->SetPixel(x0*d+cx,-y0*d+cy,RGB(0,0,0));
}
for(x0=-20;x0<=20;x0+=0.005)
 for(x=-20;x<=20;x+=0.01)
{
    y0=sin(x0);
    y=y0+cos(x0)*(x-x0);
            if((x-x0)*(x-x0)+(y-y0)*(y-y0)<=l*l)
            {
                        pDC->SetPixel(x*d+cx,-
y*d+cy,RGB(x0*200,y0*200,0));
            }
}
```

</td><td></td></tr>
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