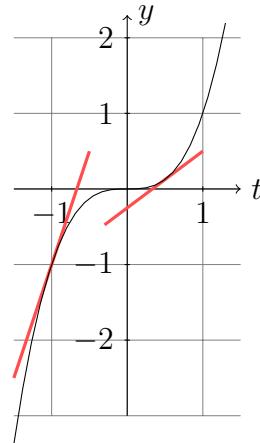


1. Determinar las tangentes de los ángulos que forman con el eje positivo del eje  $x$  las líneas tangentes a la curva  $y = x^3$  cuando  $x = 1/2$  y  $x = -1$ , construir la gráfica y representar las líneas tangentes.

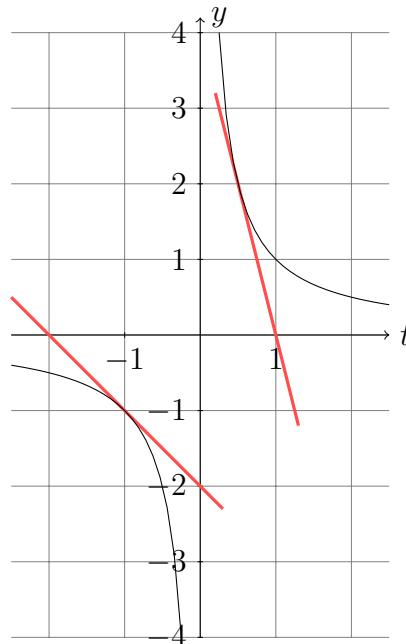
**Solución:** Dado que la derivada es  $3x^2$ , entonces



Así a)  $3/4$ , y b)  $3$ .

2. Determinar las tangentes de los ángulos que forman con el eje positivo del eje  $x$  las líneas tangentes a la curva  $y = 1/x$  cuando  $x = 1/2$  y  $x = -1$ , construir la gráfica y representar las líneas tangentes.

**Solución:** Dado que la derivada es  $-1/x^2$ , entonces



Así a)  $-4$ , b)  $-1$ .

3. Hallar la derivada de las siguientes funciones:

- i.  $y = x^4 + 3x^2 - 6.$
- ii.  $y = 6x^3 - x^2.$
- iii.  $y = \frac{x^5}{a+b} - \frac{x^2}{a-b}.$
- iv.  $y = \frac{x^3 - x^2 + 1}{5}$
- v.  $y = 2ax^3 - \frac{x^2}{b} + c.$
- vi.  $y = 6x^{7/2} + 4x^{5/2} + 2x.$
- vii.  $y = \sqrt{3x} + \sqrt[3]{x} + \frac{1}{x}.$
- viii.  $y = \frac{(x+1)^3}{x^{3/2}}.$
- ix.  $y = \sqrt[3]{x^2} 2\sqrt{x} + 5.$
- x.  $y = \frac{ax^2}{\sqrt[3]{x}} + \frac{b}{x\sqrt{x}} - \frac{\sqrt[3]{x}}{\sqrt{x}}.$
- xi.  $y = (1+4x^3)(1+2x^2).$
- xii.  $y = x(2x-1)(3x+2).$
- xiii.  $y = (2x-1)(x^2-6x+3).$
- xiv.  $y = \frac{2x^4}{b^2-x^2}.$
- xv.  $y = \frac{a-x}{a+x}.$
- xvi.  $f(t) = \frac{t^3}{1+t^2}.$
- xvii.  $f(s) = \frac{(s+4)^2}{s+3}.$
- xviii.  $y = \frac{x^3+1}{x^2-x-2}.$
- xix.  $y = (2x^2-3)^2.$
- xx.  $y = (x^2+a^2)^5.$
- xxi.  $y = \sqrt{x^2+a^2}.$
- xxii.  $y = (a+x)\sqrt{a-x}.$
- xxiii.  $y = \sqrt{\frac{1+x}{1-x}}.$
- xxiv.  $y = \frac{2x^2-1}{x\sqrt{1+x^2}}.$
- xxv.  $y = \sqrt[3]{x^2+x+1}.$
- xxvi.  $y = (1+\sqrt[3]{x})^3.$
- xxvii.  $y = \operatorname{sen}^2(x).$
- xxviii.  $y = 2\operatorname{sen}(x) + \cos(3x).$
- xxix.  $y = \tan(ax+b).$
- xxx.  $y = \frac{\operatorname{sen}(x)}{1+\cos(x)}.$
- xxxi.  $y = \operatorname{sen}(2x) \cos(3x).$
- xxxii.  $y = \cot^2(5x).$
- xxxiii.  $f(t) = t\operatorname{sen}(t) + \cos(t).$
- xxxiv.  $f(t) = \operatorname{sen}^3(t) \cos(t).$
- xxxv.  $y = a\sqrt{\cos(2x)}.$
- xxxvi.  $y = \frac{1}{2}\tan^2(x).$
- xxxvii.  $y = \ln(\cos(x)).$
- xxxviii.  $y = \ln(\tan(x)).$
- xxxix.  $y = \ln(\operatorname{sen}^2(x)).$
- xl.  $y = \frac{\tan(x)-1}{\sec(x)}.$
- xli.  $y = \ln \sqrt{\frac{1+\operatorname{sen}(x)}{1-\operatorname{sen}(x)}}.$
- xlii.  $y = \operatorname{sen}(\ln x).$
- xliii.  $f(x) = \tan(\ln x).$
- xliv.  $f(x) = \operatorname{sen}(\cos(x)).$
- xlv.  $y = \ln \frac{1+x}{1-x}.$
- xlvi.  $y = \log_3(x^2 - \operatorname{sen}(x)).$
- xlvii.  $y = \ln \frac{1+x^2}{1-x^2}.$
- xlviii.  $y = \ln(x^2 + x).$
- xlix.  $y = \ln(x^3 - 2x + 5).$
- l.  $y = x \ln x.$
- li.  $y = \ln^3 x.$

- lii.  $y = \ln(x + \sqrt{1 + x^2})$ .  
 liii.  $y = \ln(\ln x)$ .  
 liv.  $y = e^{4x+5}$ .  
 lv.  $y = a^{x^2}$ .  
 lvi.  $y = 7^{x^2+2x}$ .  
 lvii.  $y = e^x(1 - x^2)$ .  
 lviii.  $y = \frac{e^x - 1}{e^x + 1}$ .  
 lix.  $y = e^{\operatorname{sen}(x)}$ .  
 lx.  $y = a^{\tan(nx)}$ .  
 lxi.  $y = e^{\cos(x)} \operatorname{sen}(x)$ .  
 lxii.  $y = e^x \ln(\operatorname{sen}(x))$ .  
 lxiii.  $y = x^{1/x}$ .  
 lxiv.  $y = x^{\ln x}$ .  
 lxv.  $y = x^x$ .  
 lxvi.  $y = e^{x^x}$ .  
 lxvii.  $y = \arcsin(x/a)$ .  
 lxviii.  $y = (\arcsin x)^2$ .  
 lxix.  $y = \arctan(x^2 + 1)$ .  
 lxx.  $y = \arctan\left(\frac{2x}{1 - x^2}\right)$ .  
 lxxi.  $y = \frac{\arccos(x)}{x}$ .  
 lxxii.  $y = x \operatorname{arc sen}(x)$ .

**Solución:**

- i.  $y' = 4x^3 + 6x$ .  
 ii.  $y' = 18x^2 - 2x$ .  
 iii.  $y' = \frac{5x^4}{a+b} - \frac{2x}{a-b}$ .  
 iv.  $y' = \frac{3x^2 - 2x}{5}$ .  
 v.  $y' = 6ax^2 - \frac{2x}{b}$ .  
 vi.  $y' = 21x^{5/2} + 10x^{3/2} + 2$ .  
 vii.  $y' = \frac{\sqrt{3}}{2\sqrt{x}} + \frac{1}{3\sqrt[3]{x^2}} - \frac{1}{x^2}$ .  
 viii.  $y' = \frac{3(x+1)^2(x-1)}{2x^{5/2}}$ .  
 ix.  $y' = \frac{2}{3}\frac{1}{\sqrt[3]{x}} - \frac{1}{\sqrt{x}}$ .  
 x.  $y' = \frac{5ax^{2/3}}{3} - \frac{3b}{2x^{5/2}} + \frac{1}{6x^{7/6}}$ .  
 xi.  $y' = 4x + 12x^2 + 40x^4$ .  
 xii.  $y' = 18x^2 + 2x - 2$ .  
 xiii.  $y' = 6x^2 - 26x + 12$ .  
 xiv.  $y' = \frac{4x^3(2b^2 - x^2)}{(b^2 - x^2)^2}$ .  
 xv.  $y' = \frac{-2a}{(a+x)^2}$ .  
 xvi.  $\dot{f}(t) = \frac{t^2(3+t^2)}{(1+t^2)^2}$ .  
 xvii.  $f'(s) = \frac{(s+4)(s+2)}{(s+3)^2}$ .  
 xviii.  $y' = \frac{x^4 - 2x^3 - 6x^2 - 2x + 1}{(x^2 - x - 2)^2}$ .  
 xix.  $y' = 8x(2x^2 - 3)$ .  
 xx.  $y' = 10x(x^2 + a^2)^4$ .  
 xxi.  $y' = \frac{x}{\sqrt{x^2 + a^2}}$ .  
 xxii.  $y' = \frac{a - 3x}{2\sqrt{a - x}}$ .  
 xxiii.  $y' = \frac{1}{(1-x)\sqrt{1-x^2}}$ .

$$\text{xxiv. } y' = \frac{4x^2 + 1}{x^2(1+x^2)^{3/2}}.$$

$$\text{xxv. } y' = \frac{2x+1}{3\sqrt[3]{(x^2+x+1)^2}}.$$

$$\text{xxvi. } y' = \left(1 + \frac{1}{\sqrt[3]{x}}\right)^2.$$

$$\text{xxvii. } y' = 2\sin(x)\cos(x) = \sin(2x).$$

$$\text{xxviii. } y' = 2\cos(x) - 3\sin(3x).$$

$$\text{xxix. } y' = \frac{a}{\cos^2(ax+b)}.$$

$$\text{xxx. } y' = \frac{1}{1+\cos(x)}.$$

$$\text{xxxi. } y' = 2\cos(2x)\cos(3x) - 3\sin(2x)\sin(3x).$$

$$\text{xxxii. } y' = -10\cot(5x)\csc^2(5x).$$

$$\text{xxxiii. } \dot{f}(t) = t\cos(t).$$

$$\text{xxxiv. } \dot{f}(t) = \sin^2(t)(3\cos^2(t) - \sin^2(t)).$$

$$\text{xxxv. } y' = -\frac{a\sin(2x)}{\sqrt{\cos(2x)}}.$$

$$\text{xxxvi. } y' = \tan(x)\sec^2(x).$$

$$\text{xxxvii. } y' = -\tan(x).$$

$$\text{xxxviii. } y' = \frac{2}{\sin(2x)}.$$

$$\text{xxxix. } y' = 2\cot(x).$$

$$\text{xl. } y' = \sin(x) + \cos(x).$$

$$\text{xli. } y' = \frac{1}{\cos(x)}.$$

$$\text{xlii. } f'(x) = \frac{\cos(\ln x)}{x}.$$

$$\text{xliii. } f'(x) = \frac{\sec^2(\ln x)}{x}.$$

$$\text{xliv. } f'(x) = -\sin(x)\cos(\cos(x)).$$

$$\text{xlv. } y' = \frac{2}{1-x^2}.$$

$$\text{xlvi. } y' = \frac{2x-\cos(x)}{(x^2-\sin(x))\ln 3}.$$

$$\text{xlvii. } y' = \frac{4x}{1-x^4}.$$

$$\text{xlviii. } y' = \frac{2x+1}{x^2+x}.$$

$$\text{xlix. } y' = \frac{3x^2-2}{x^3-2x+5}.$$

$$\text{l. } y' = 1 + \ln x.$$

$$\text{li. } y' = \frac{3\ln^2 x}{x}.$$

$$\text{lii. } y' = \frac{1}{\sqrt{1+x^2}}.$$

$$\text{liii. } y' = \frac{1}{x\ln x}.$$

$$\text{liv. } y' = 4e^{4x+5}.$$

$$\text{lv. } y' = 2xa^{x^2}\ln a.$$

$$\text{lvi. } y' = 2(x+1)7^{x^2+2x}\ln 7.$$

$$\text{lvii. } y' = e^x(1-2x-x^2).$$

$$\text{lviii. } y' = \frac{2e^x}{(e^x+1)^2}.$$

$$\text{lix. } y' = e^{\sin(x)}\cos(x).$$

$$\text{lx. } y' = na^{\tan(nx)}\sec^2(nx)\ln a.$$

$$\text{lxii. } y' = e^{\cos(x)}(\cos(x)-\sin^2(x)).$$

$$\text{lxiii. } y' = x^{1/x}\left(\frac{1-\ln x}{x^2}\right).$$

$$\text{lxiv. } y' = 2x^{\ln x-1}\ln x.$$

$$\text{lxv. } y' = x^x(1+\ln x).$$

$$\text{lxxvi. } y' = e^{x^x} (1 + \ln x) x^x.$$

$$\text{lxxvii. } y' = \frac{1}{\sqrt{a^2 - x^2}}.$$

$$\text{lxxviii. } y' = \frac{2 \operatorname{arc sen}(x)}{\sqrt{1 - x^2}}.$$

$$\text{lxxix. } y' = \frac{2x}{1 + (x^2 + 1)^2}.$$

$$\text{lxxx. } y' = \frac{2}{1 + x^2}.$$

$$\text{lxxxi. } y' = -\frac{x + \sqrt{1 + x^2} \arccos(x)}{x^2 \sqrt{1 - x^2}}.$$

$$\text{lxxii. } y' = \operatorname{arc sen}(x) + \frac{x}{\sqrt{1 - x^2}}.$$