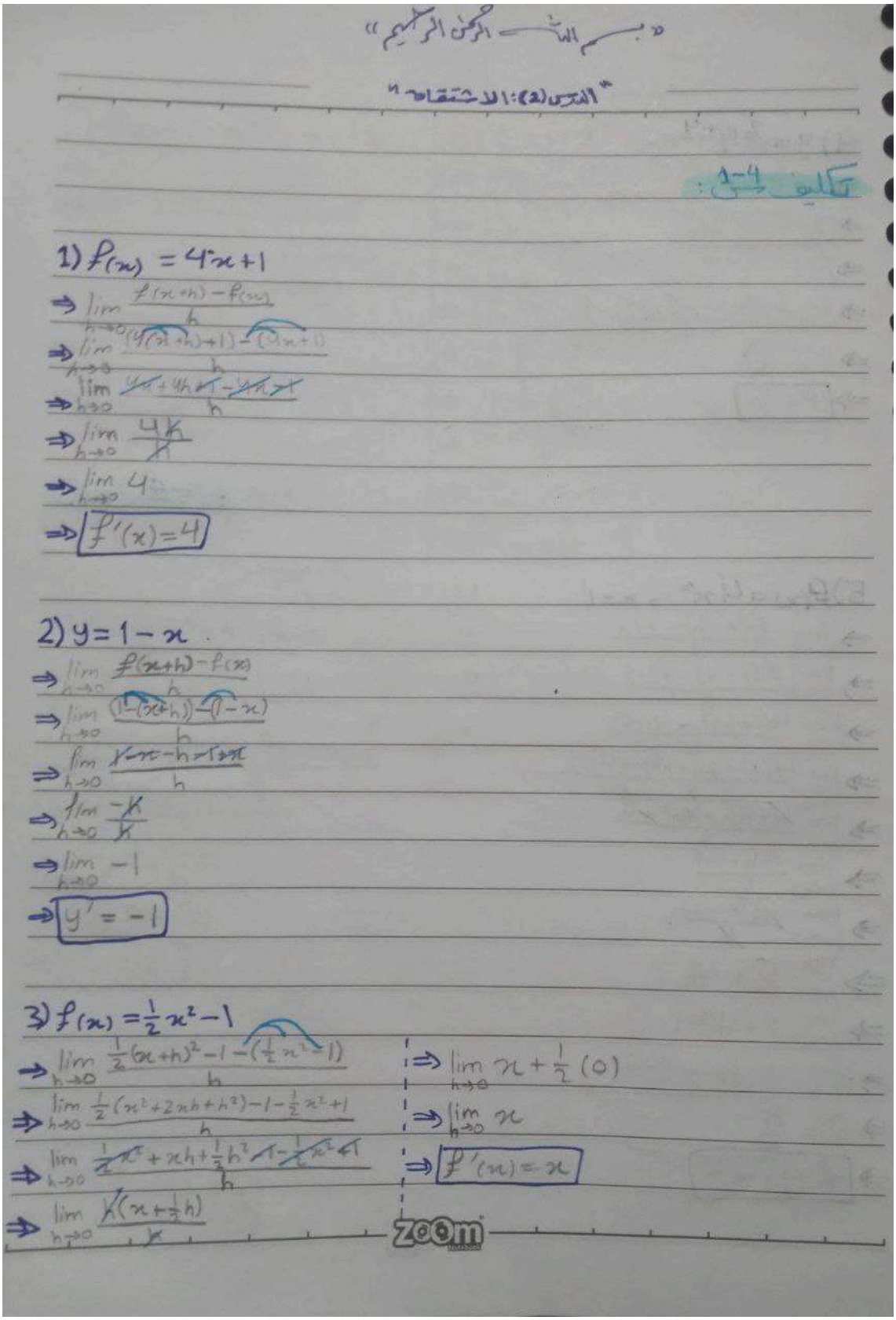
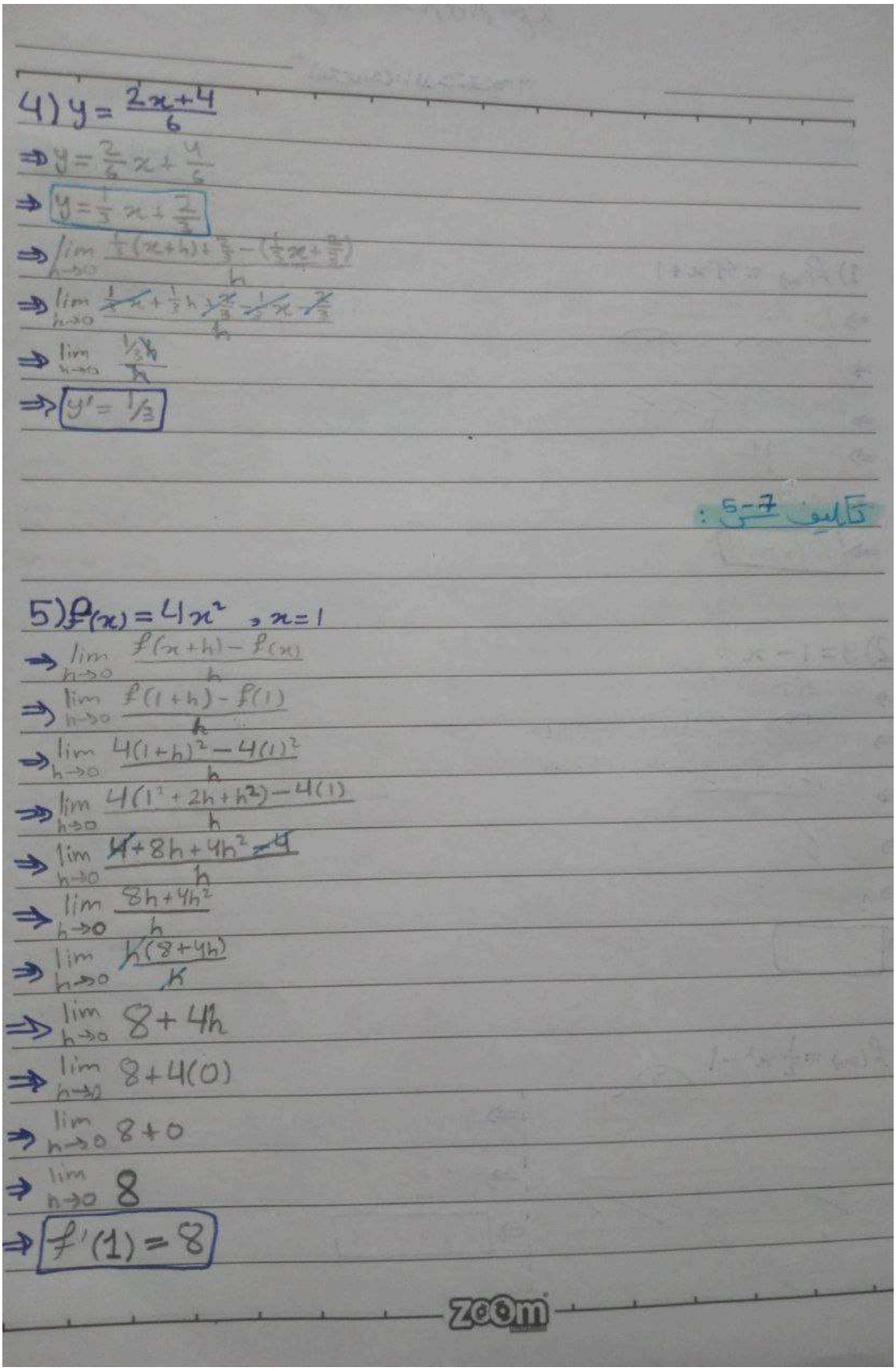
الدرس الثّاني: الاشتقاق



الدرس الثّاني: الاشتقاق



4) $y = \frac{2x+4}{6}$

$\Rightarrow y = \frac{2}{6}x + \frac{4}{6}$

$\Rightarrow \boxed{y = \frac{1}{3}x + \frac{2}{3}}$

$\Rightarrow \lim_{h\to 0} \frac{\frac{1}{3}(x+h)+\frac{2}{3} - (\frac{1}{3}x+\frac{2}{3})}{h}$

$\Rightarrow \lim_{h\to 0} \frac{\frac{1}{3}x + \frac{1}{3}h + \frac{2}{3} - \frac{1}{3}x - \frac{2}{3}}{h}$

$\Rightarrow \lim_{h\to 0} \frac{\frac{1}{3}h}{h}$

$\Rightarrow \boxed{y' = \frac{1}{3}}$

تكليف ص 5-7 :

5) $f(x) = 4x^2 \quad , x = 1$

$\Rightarrow \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{f(1+h) - f(1)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{4(1+h)^2 - 4(1)^2}{h}$

$\Rightarrow \lim_{h\to 0} \frac{4(1^2 + 2h + h^2) - 4(1)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{4 + 8h + 4h^2 - 4}{h}$

$\Rightarrow \lim_{h\to 0} \frac{8h + 4h^2}{h}$

$\Rightarrow \lim_{h\to 0} \frac{h(8+4h)}{h}$

$\Rightarrow \lim_{h\to 0} 8 + 4h$

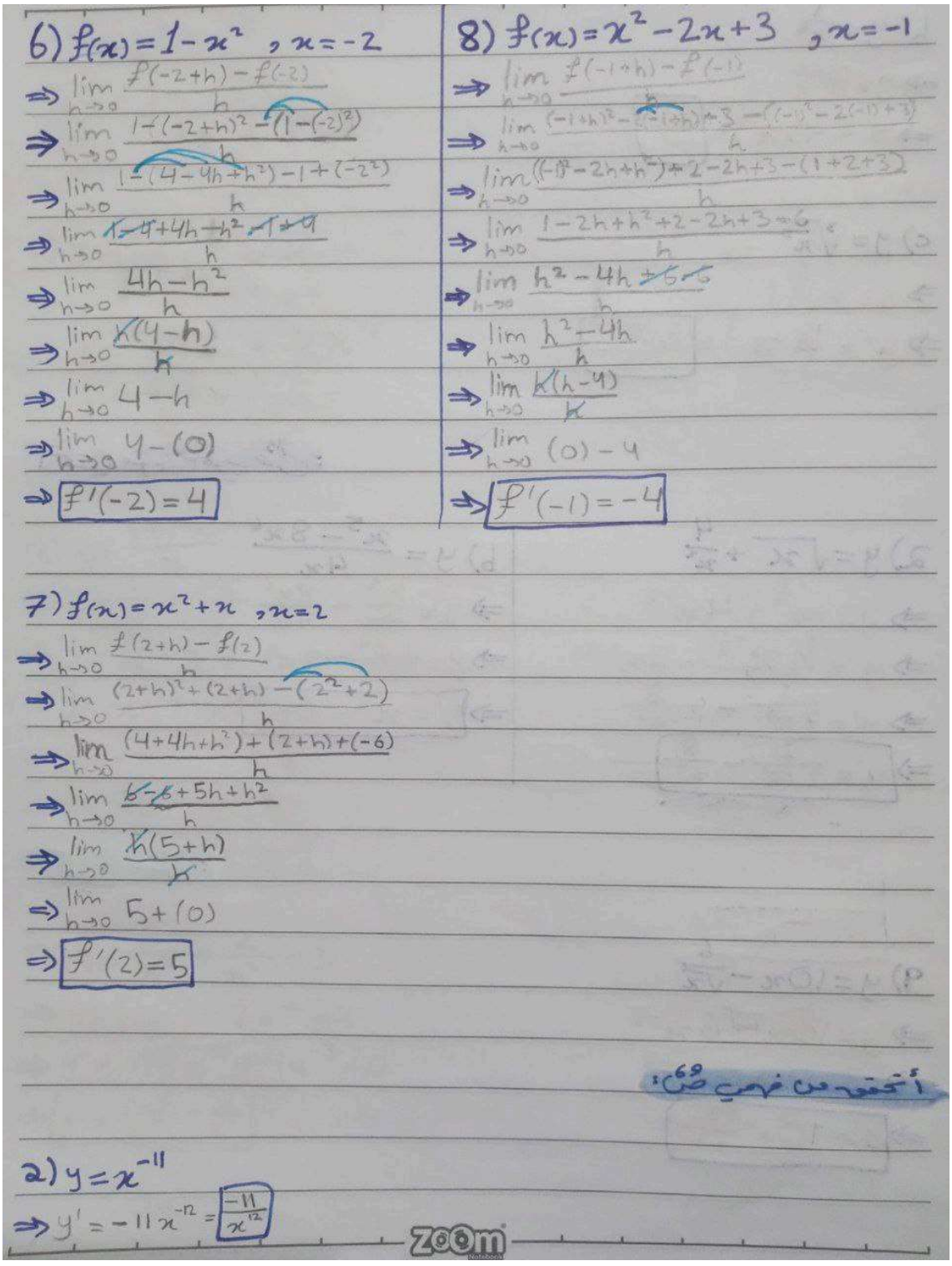
$\Rightarrow \lim_{h\to 0} 8 + 4(0)$

$\Rightarrow \lim_{h\to 0} 8 + 0$

$\Rightarrow \lim_{h\to 0} 8$

$\Rightarrow \boxed{f'(1) = 8}$

الدرس الثّاني: الاشتقاق



6) $f(x)=1-x^2$, $x=-2$

$\Rightarrow \lim_{h\to 0} \frac{f(-2+h)-f(-2)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{1-(-2+h)^2-(1-(-2)^2)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{1-(4-4h+h^2)-1+(-2^2)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{1-4+4h-h^2-1+4}{h}$

$\Rightarrow \lim_{h\to 0} \frac{4h-h^2}{h}$

$\Rightarrow \lim_{h\to 0} \frac{h(4-h)}{h}$

$\Rightarrow \lim_{h\to 0} 4-h$

$\Rightarrow \lim_{h\to 0} 4-(0)$

$\Rightarrow \boxed{f'(-2)=4}$

8) $f(x)=x^2-2x+3$, $x=-1$

$\Rightarrow \lim_{h\to 0} \frac{f(-1+h)-f(-1)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{(-1+h)^2-2(-1+h)+3-((-1)^2-2(-1)+3)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{(1-2h+h^2)+2-2h+3-(1+2+3)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{1-2h+h^2+2-2h+3-6}{h}$

$\Rightarrow \lim_{h\to 0} \frac{h^2-4h}{h}$

$\Rightarrow \lim_{h\to 0} \frac{h(h-4)}{h}$

$\Rightarrow \lim_{h\to 0} (0)-4$

$\Rightarrow \boxed{f'(-1)=-4}$

7) $f(x)=x^2+x$, $x=2$

$\Rightarrow \lim_{h\to 0} \frac{f(2+h)-f(2)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{(2+h)^2+(2+h)-(2^2+2)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{(4+4h+h^2)+(2+h)+(-6)}{h}$

$\Rightarrow \lim_{h\to 0} \frac{5h+h^2}{h}$

$\Rightarrow \lim_{h\to 0} \frac{h(5+h)}{h}$

$\Rightarrow \lim_{h\to 0} 5+(0)$

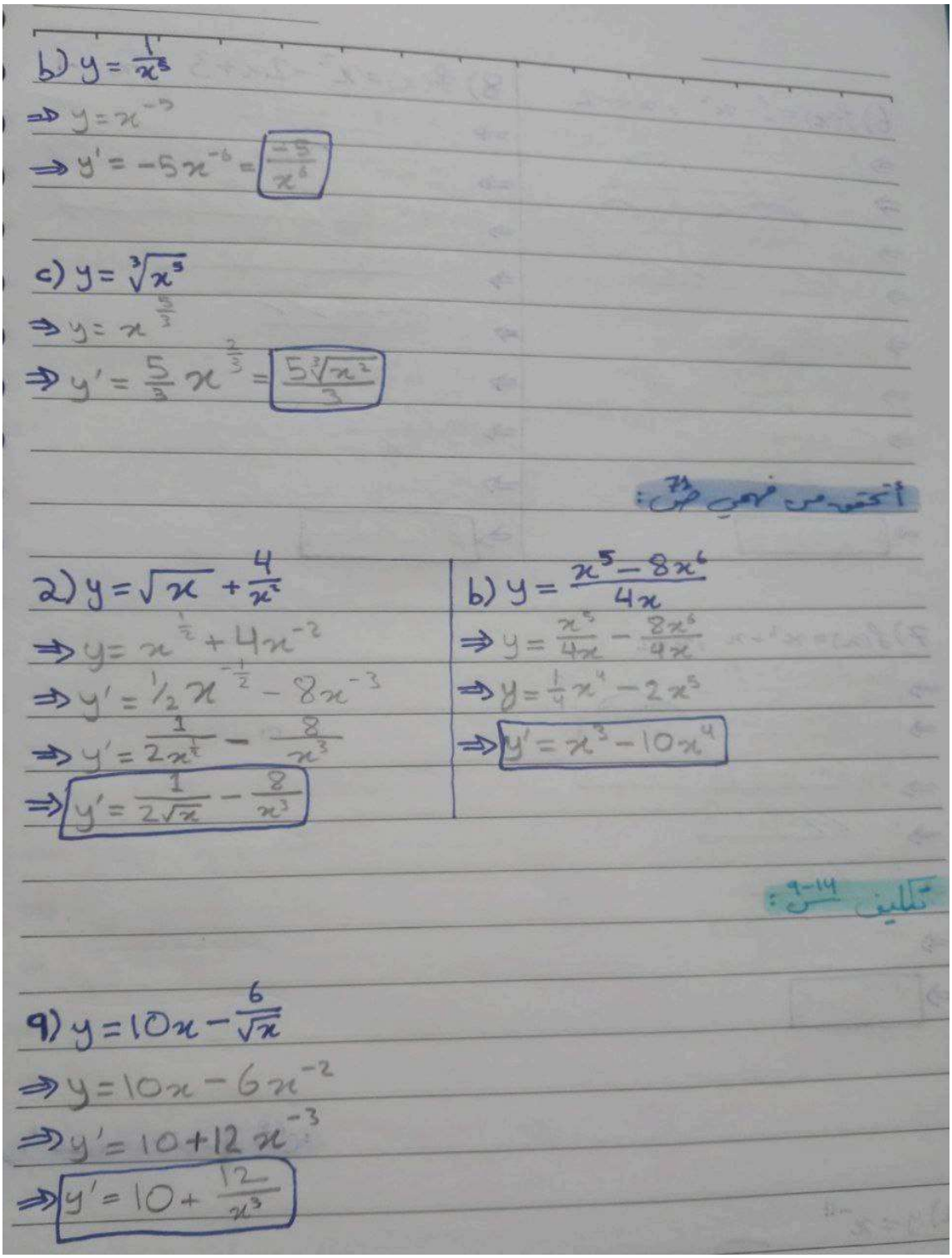
$\Rightarrow \boxed{f'(2)=5}$

أتحقق من فهمي ص69:

2) $y=x^{-11}$

$\Rightarrow y'=-11x^{-12}=\boxed{\frac{-11}{x^{12}}}$

الدرس الثّاني: الاشتقاق



b) $y = \frac{1}{x^5}$

$\Rightarrow y = x^{-5}$

$\Rightarrow y' = -5x^{-6} = \boxed{\frac{-5}{x^6}}$

c) $y = \sqrt[3]{x^5}$

$\Rightarrow y = x^{\frac{5}{3}}$

$\Rightarrow y' = \frac{5}{3}x^{\frac{2}{3}} = \boxed{\frac{5\sqrt[3]{x^2}}{3}}$

أتحقق من فهمي ص 73:

2) $y = \sqrt{x} + \frac{4}{x^2}$

$\Rightarrow y = x^{\frac{1}{2}} + 4x^{-2}$

$\Rightarrow y' = \frac{1}{2}x^{-\frac{1}{2}} - 8x^{-3}$

$\Rightarrow y' = \frac{1}{2x^{\frac{1}{2}}} - \frac{8}{x^3}$

$\Rightarrow \boxed{y' = \frac{1}{2\sqrt{x}} - \frac{8}{x^3}}$

b) $y = \frac{x^5 - 8x^6}{4x}$

$\Rightarrow y = \frac{x^5}{4x} - \frac{8x^6}{4x}$

$\Rightarrow y = \frac{1}{4}x^4 - 2x^5$

$\Rightarrow \boxed{y' = x^3 - 10x^4}$

تمارين ص 14-9:

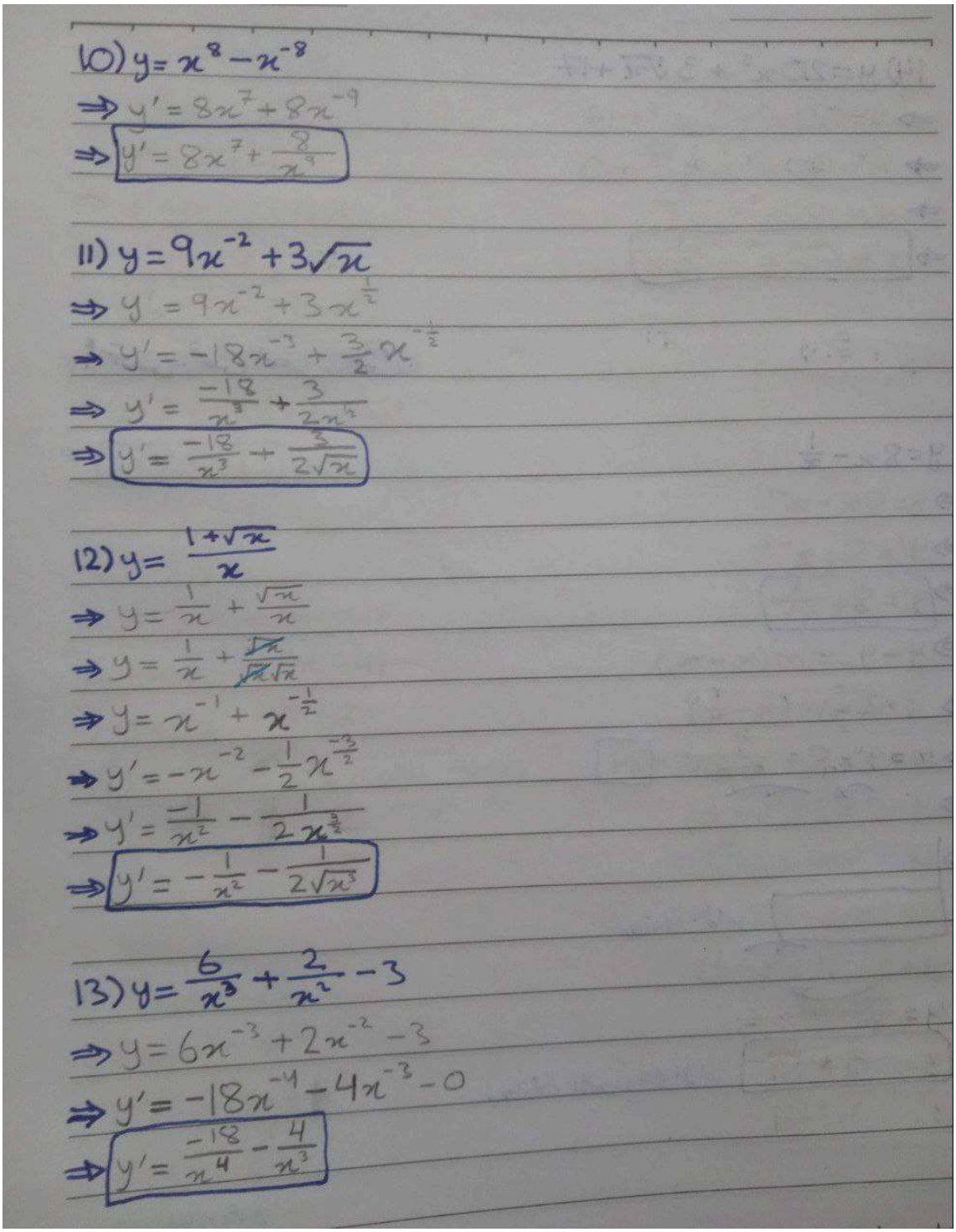
9) $y = 10x - \frac{6}{\sqrt{x}}$

$\Rightarrow y = 10x - 6x^{-2}$

$\Rightarrow y' = 10 + 12x^{-3}$

$\Rightarrow \boxed{y' = 10 + \frac{12}{x^3}}$

الدرس الثّاني: الاشتقاق



10) $y = x^8 - x^{-8}$

$\Rightarrow y' = 8x^7 + 8x^{-9}$

$\Rightarrow \boxed{y' = 8x^7 + \frac{8}{x^9}}$

11) $y = 9x^{-2} + 3\sqrt{x}$

$\Rightarrow y = 9x^{-2} + 3x^{\frac{1}{2}}$

$\Rightarrow y' = -18x^{-3} + \frac{3}{2}x^{-\frac{1}{2}}$

$\Rightarrow y' = \frac{-18}{x^3} + \frac{3}{2x^{\frac{1}{2}}}$

$\Rightarrow \boxed{y' = \frac{-18}{x^3} + \frac{3}{2\sqrt{x}}}$

12) $y = \frac{1+\sqrt{x}}{x}$

$\Rightarrow y = \frac{1}{x} + \frac{\sqrt{x}}{x}$

$\Rightarrow y = \frac{1}{x} + \frac{\sqrt{x}}{\sqrt{x}\sqrt{x}}$

$\Rightarrow y = x^{-1} + x^{-\frac{1}{2}}$

$\Rightarrow y' = -x^{-2} - \frac{1}{2}x^{-\frac{3}{2}}$

$\Rightarrow y' = \frac{-1}{x^2} - \frac{1}{2x^{\frac{3}{2}}}$

$\Rightarrow \boxed{y' = -\frac{1}{x^2} - \frac{1}{2\sqrt{x^3}}}$

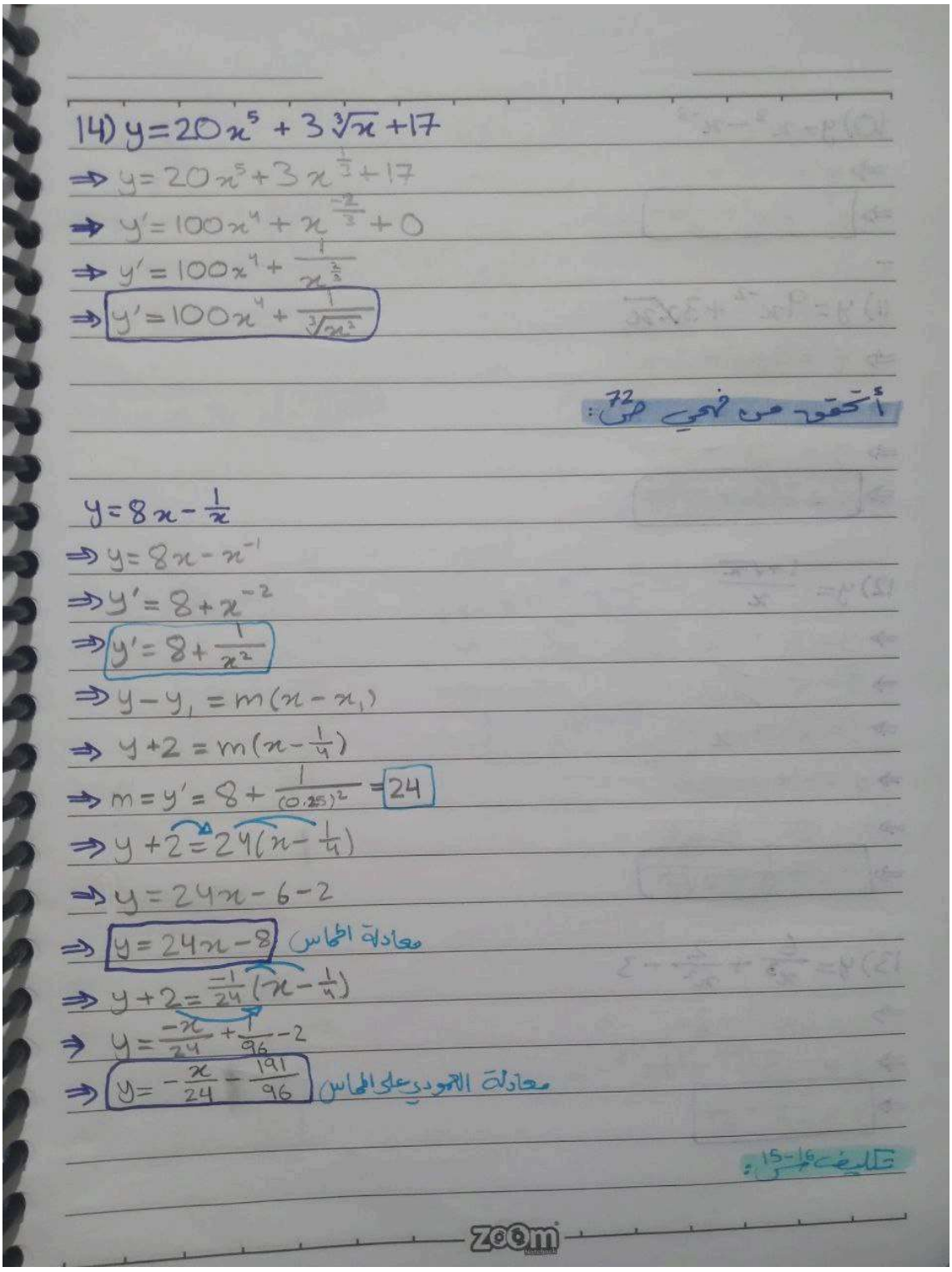
13) $y = \frac{6}{x^3} + \frac{2}{x^2} - 3$

$\Rightarrow y = 6x^{-3} + 2x^{-2} - 3$

$\Rightarrow y' = -18x^{-4} - 4x^{-3} - 0$

$\Rightarrow \boxed{y' = \frac{-18}{x^4} - \frac{4}{x^3}}$

الدرس الثّاني: الاشتقاق



14) $y = 20x^5 + 3\sqrt[3]{x} + 17$

$\Rightarrow y = 20x^5 + 3x^{\frac{1}{3}} + 17$

$\Rightarrow y' = 100x^4 + x^{\frac{-2}{3}} + 0$

$\Rightarrow y' = 100x^4 + \frac{1}{x^{\frac{2}{3}}}$

$\Rightarrow \boxed{y' = 100x^4 + \frac{1}{\sqrt[3]{x^2}}}$

أتحقق من فهمي ص72:

$y = 8x - \frac{1}{x}$

$\Rightarrow y = 8x - x^{-1}$

$\Rightarrow y' = 8 + x^{-2}$

$\Rightarrow \boxed{y' = 8 + \frac{1}{x^2}}$

$\Rightarrow y - y_1 = m(x - x_1)$

$\Rightarrow y + 2 = m(x - \frac{1}{4})$

$\Rightarrow m = y' = 8 + \frac{1}{(0.25)^2} = \boxed{24}$

$\Rightarrow y + 2 = 24(x - \frac{1}{4})$

$\Rightarrow y = 24x - 6 - 2$

$\Rightarrow \boxed{y = 24x - 8}$ معادلة المماس

$\Rightarrow y + 2 = \frac{-1}{24}(x - \frac{1}{4})$

$\Rightarrow y = \frac{-x}{24} + \frac{1}{96} - 2$

$\Rightarrow \boxed{y = -\frac{x}{24} - \frac{191}{96}}$ معادلة العمودي على المماس

تدرب ص15-16:

الدرس الثّاني: الاشتقاق

15) $y=(4)^2-(4)=\boxed{12}$

$\Rightarrow y=x^2-x$

$\Rightarrow y'=2x-1$

$\Rightarrow y'=m=2(4)-1$

$\Rightarrow y'=\boxed{m=7}$

$\Rightarrow y-y_1=m(x-x_1)$

$\Rightarrow y-12=7(x-4)$

$\Rightarrow y=7x-28+12$

$\Rightarrow \boxed{y=7x-16}$ معادلة المماس

16) $m=\boxed{\frac{-1}{7}}$

$\Rightarrow y-y_1=m(x-x_1)$

$\Rightarrow y-12=\frac{-1}{7}(x-4)$

$\Rightarrow y=\frac{-x}{7}+\frac{4}{7}+12$

$\Rightarrow \boxed{y=\frac{-x+88}{7}}$ معادلة العمودي على المماس

أتحقق من فهمي ص74:

2) $f(x)=1-\sqrt{x}$

$\Rightarrow f(x)=1-x^{\frac{1}{2}}$

$\Rightarrow f'(x)=0-\frac{1}{2}x^{\frac{-1}{2}}$

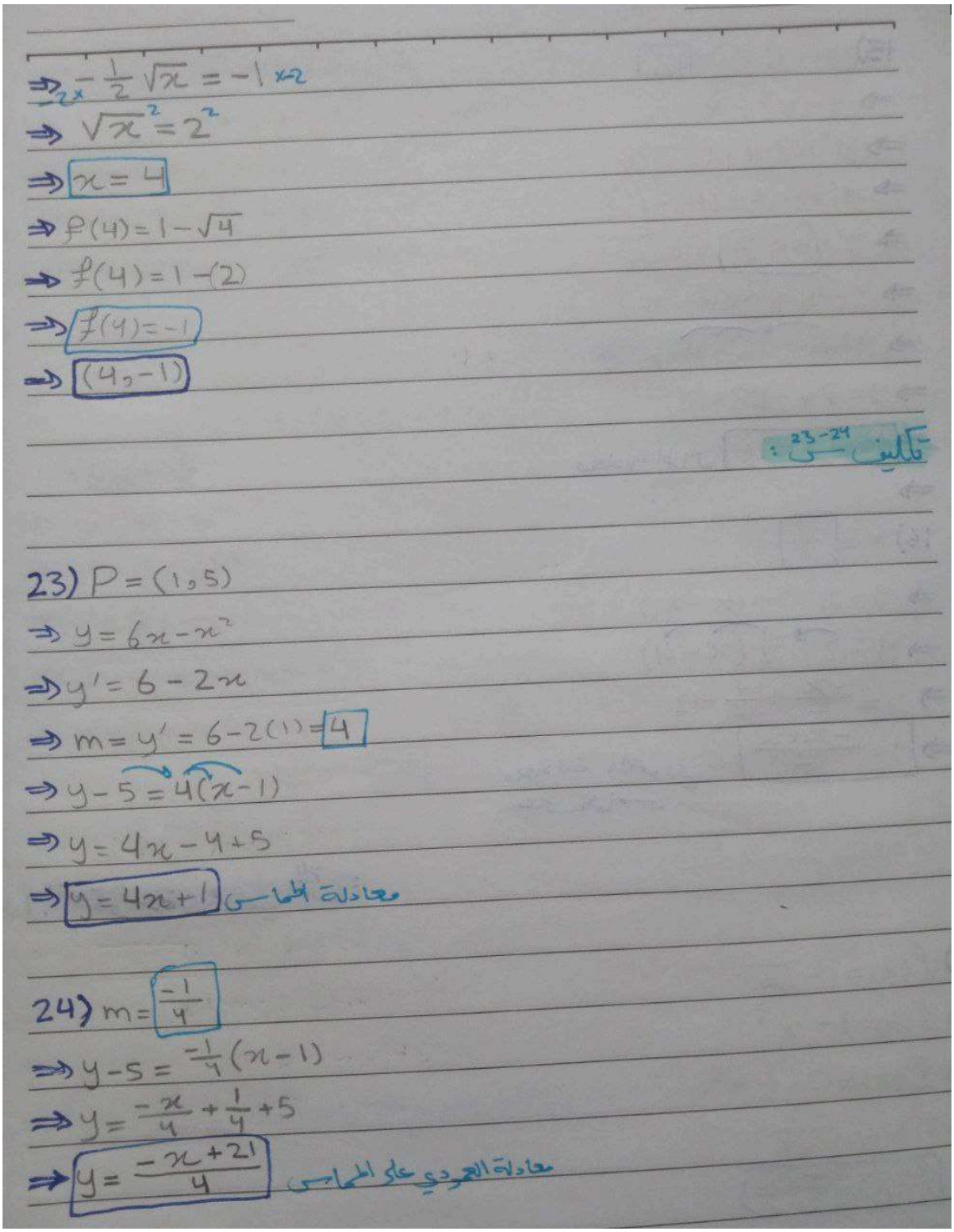
$\Rightarrow f'(x)=\frac{-1}{2x^{\frac{1}{2}}}$

$\Rightarrow \boxed{f'(x)=\frac{-1}{2\sqrt{x}}}$

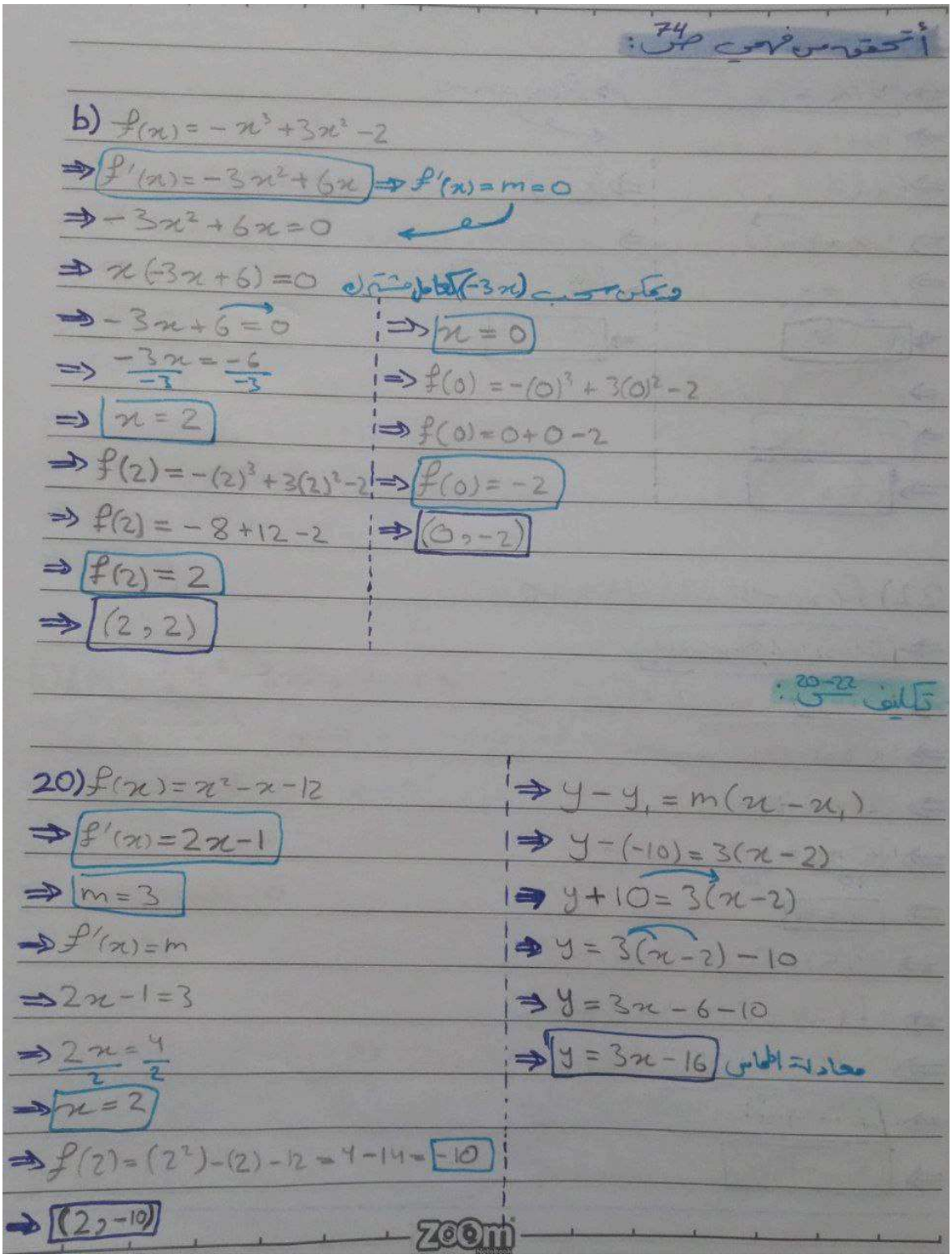
$\Rightarrow -\frac{1}{4}=\frac{-1}{2\sqrt{x}}\times 2\sqrt{x}$

$2\sqrt{x}\times$

الدرس الثّاني: الاشتقاق



الدرس الثّاني: الاشتقاق



الدرس الثّاني: الاشتقاق