



اختبار نهاية الوحدة الثانية

1	d
2	b
3	a
4	c
5	c
6	a
7	b
8	$(fg)'(x) = (f(x))(g'(x)) + (g(x))(f'(x))$ $(fg)'(2) = (f(2))(g'(2)) + (g(2))(f'(2))$ $= (3)(2) + (1)(-4) = 2$
9	$\left(\frac{f}{g}\right)'(x) = \frac{(g(x))(f'(x)) - (f(x))(g'(x))}{(g(x))^2}$ $\left(\frac{f}{g}\right)'(2) = \frac{(g(2))(f'(2)) - (f(2))(g'(2))}{(g(2))^2}$ $= \frac{(1)(-4) - (3)(2)}{(1)^2} = -10$
10	$(3f - 4fg)'(x) = 3f'(x) - 4((f(x))(g'(x)) + (g(x))(f'(x)))$ $(3f - 4fg)'(2) = 3f'(2) - 4((f(2))(g'(2)) + (g(2))(f'(2)))$ $= 3(-4) - 4((3)(2) + (1)(-4))$ $= -12 - 4(2)$ $= -20$
11	$h'(t) = 0.12 \times 0.1e^{0.1t}$ $= 0.012e^{0.1t}$



12	$h'(3) = 0.012e^{0.1(3)} \approx 0.016$
13	$f'(x) = \frac{(3x+1)(1) - (x)(3)}{(3x+1)^2} = \frac{1}{(3x+1)^2}$ $f'(1) = \frac{1}{(3(1)+1)^2} = \frac{1}{16}$
14	$f'(x) = (x^2 + 2) \left(1 + \frac{1}{2\sqrt{x}}\right) + (x + \sqrt{x})(2x)$ $f'(4) = (4^2 + 2) \left(1 + \frac{1}{2\sqrt{4}}\right) + (4 + \sqrt{4})(2 \times 4) = 18 \left(1 + \frac{1}{4}\right) + 6(8) = 70.5$
15	$f'(x) = 3e^{3x} - 3e^{-3x}$ $f'(1) = 3e^3 - 3e^{-3}$
16	$f'(x) = -2x$ $f'(20) = -2(20) = -40$
17	$f'(x) = (x^2)(3)(3x-1)^2(3) + (3x-1)^3(2x)$ $f'(1) = (1)(3)(3-1)^2(3) + (3-1)^3(2)$ $= 36 + 16 = 52$
18	$f'(x) = (x+3)^2(3e^{3x}) + (e^{3x})(2)(x+3)(1)$ $f'(2) = (2+3)^2(3e^6) + (e^6)(2)(2+3)(1)$ $= 75e^6 + 10e^6$ $= 85e^6$
19	$f'(x) = 3 \times \frac{1}{x} - \frac{1}{x^2}$ $f'(e) = \frac{3}{e} - \frac{1}{e^2}$
20	$f'(x) = \frac{8x^3}{2\sqrt{2x^4+7}}$



21	$f'(x) = \frac{-1 \times 5(x^2 + 16)^4(2x)}{(x^2 + 16)^{10}}$ $= \frac{-10x}{(x^2 + 16)^6}$
22	$f(x) = (x^2 - 5x + 2)^{\frac{1}{4}}$ $f'(x) = \frac{1}{4}(x^2 - 5x + 2)^{-\frac{3}{4}}(2x - 5)$ $= \frac{2x - 5}{4\sqrt[4]{(x^2 - 5x + 2)^3}}$
23	$f'(x) = -40(8x^2 - 6)^{-41}(16x)$ $= -640x(8x^2 - 6)^{-41}$
24	$f'(x) = \frac{-1 \times 2}{(3 + 2x)^2} = \frac{-2}{(3 + 2x)^2}$
25	$f'(x) = \frac{(x^2 + 1)(3x^2) - (x^3)(2x)}{(x^2 + 1)^2}$ $= \frac{x^4 + 3x^2}{(x^2 + 1)^2}$
26	$f'(x) = (2x - 8)^2(6x) + (3x^2 - 4)(2)(2x - 8)^1(2)$ $= (2x - 8)(6x(2x - 8) + 4(3x^2 - 4))$ $= (2x - 8)(24x^2 - 48x - 16)$
27	$f'(x) = x^5(6x + 4) + (3x^2 + 4x - 7)(5x^4)$ $= 6x^6 + 4x^5 + 15x^6 + 20x^5 - 35x^4$ $= 21x^6 + 24x^5 - 35x^4$ حل آخر: $f(x) = 3x^7 + 4x^6 - 7x^5$ $f'(x) = 21x^6 + 24x^5 - 35x^4$ بفك الأقواس:



28	$f'(x) = (x^3)(4)(2x+6)^3(2) + (2x+6)^4(3x^2)$ $= 2x^2(2x+6)^3(7x+9)$
29	$f'(x) = 3(e^{-x} + e^x)^2(-e^{-x} + e^x)$
30	$f'(x) = (2x^3)(-e^{-x}) + (e^{-x})(6x^2)$ $= -2x^3e^{-x} + 6x^2e^{-x}$
31	$f'(x) = \frac{(x+1)(e^x) - (e^x)(1)}{(x+1)^2}$ $= \frac{xe^x}{(x+1)^2}$
32	$f'(x) = 5 \times \frac{5}{5x-4} = \frac{25}{5x-4}$
33	$f'(x) = \frac{e^x}{e^x} = 1$
34	$f'(x) = \frac{6x+2}{3x^2+2x-1}$
35	$f'(x) = (x^5)(3 \cos 3x) + (\sin 3x)(5x^4)$ $= 3x^5 \cos 3x + 5x^4 \sin 3x$
36	$f(x) = (\cos x)^2 + \sin x$ $f'(x) = 2(\cos x)^1(-\sin x) + \cos x$ $= -2 \cos x \sin x + \cos x$
37	$f'(x) = \frac{(x) \left(\frac{-\sin x}{2\sqrt{\cos x}} \right) - (\sqrt{\cos x})(1)}{x^2} = \frac{-\sin x}{2x\sqrt{\cos x}} - \frac{\sqrt{\cos x}}{x^2}$
38	$f'(x) = (\sin 5x) \left(\frac{-\sin x}{\cos x} \right) + (\ln(\cos x))(5 \cos 5x)$
39	$f'(x) = \frac{\frac{-1 \times 2x}{(x^2+9)^2}}{\frac{1}{x^2+9}} = \frac{-1 \times 2x}{(x^2+9)^2} \times \frac{x^2+9}{1} = \frac{-2x}{x^2+9}$
40	$f'(x) = (e^{2x})(2 \cos 2x) + (\sin 2x)(2e^{2x}) = 2e^{2x}(\cos 2x + \sin 2x)$



41	$N'(t) = 1000 \left(\frac{3 \times 2t}{(t^2 + 50)^2} \right) = \frac{6000t}{(t^2 + 50)^2}$
42	$N'(1) = \frac{6000}{(1 + 50)^2} \approx 2.3$
43	$P'(t) = \frac{-2000 \times 4}{(4t + 80)^2} = \frac{-8000}{(4t + 80)^2}$
44	$P'(10) = \frac{-8000}{(40 + 80)^2} \approx -0.56$ يتناقص عدد الغزلان بمعدل 0.56 غزال كل شهر بعد 10 أشهر من الآن
45	$P'(t) = \frac{-700 \times 2t}{(t^2 + 1)^2} = \frac{-1400t}{(t^2 + 1)^2}$
46	$P'(3) = \frac{-1400 \times 3}{(9 + 1)^2} = -42$ يتناقص عدد السكان بمعدل 42 ألف شخص لكل سنة بعد 3 سنوات.