Name Key

12.4 Practice

Find the derivative of each function.

1) $f(x)=4x^2-3$

$8x$

2) $b(m)=3m^{\frac{2}{3}}-2m^{\frac{3}{2}}$

$2m^{-1/3}-3m^{1/2}$

$\frac{2}{\sqrt[3]{m}}-3\sqrt{m}$

3) $g(t)=-t^2+2t+11$

$-2t+2$

4) $n(t)=\frac{1}{t}+\frac{3}{t^2}+\frac{2}{t^3}+4$

$t^{-1}+3t^{-2}+2t^{-3}+4$

$-1t^{-2}-6t^{-3}-6t^{-4}$

$\frac{-1}{t^2}-\frac{6}{t^3}-\frac{6}{t^4}$

5) $m(j)=14j-13$

14

6) $f(x)=3x^{\frac{1}{2}}-x^{\frac{3}{2}}+2x^{-\frac{1}{2}}$

$\frac{3}{2}x^{-1/2}-\frac{3}{2}x^{+1/2}-x^{-3/2}$

$\frac{3}{2\sqrt{x}}-\frac{3\sqrt{x}}{2}-\frac{1}{\sqrt{x^3}}$

7) $v(n)=5n^2+9n-17$

$10n+9$

8) $q(c)=c^9-3c^5+5c^2-3c$

$9c^8-15c^4+10c-3$

9) $h(c)=c^3+2c^2-c+5$

$3c^2+4c-1$

10) $f(x)=-5x^3-9x^4+8x^5$

$-15x^2-36x^3+40x^4$

11) $r(b)=2b^3-10b$

$6b^2-10$

12) $y(f)=-11f$

-11

13) $p(v)=7v+4$

7

14) $z(n)=2n^2+7n$

$4n+7$

15) $g(h)=2h^{\frac{1}{2}}+6h^{\frac{1}{3}}-2h^{\frac{3}{2}}$

$h^{-1/2}+2h^{-2/3}-3h^{1/2}$

$\frac{1}{\sqrt{h}}+\frac{2}{\sqrt[3]{h^2}}-3\sqrt{h}$

16) $j(x) = (2x^2 + 6x)(2x^3 + 5x^2)$

$(4x+6)(2x^3+5x^2) + (6x^2+10x)(2x^2+6x)$

$8x^4 + 20x^3 + 12x^3 + 30x^2 + 12x^4 + 36x^3 + 20x^3$

$+ 60x^2$

$20x^4 + 88x^3 + 90x^2$

OR

$4x^5 + 10x^4 + 12x^4 + 30x^3$ $\frac{d}{dx}$

$20x^4 + 40x^3 + 48x^3 + 90x^2$

$20x^4 + 88x^3 + 90x^2$

match!

17) $m(x) = (x^3 - 6x)(2 - 4x^3)$

$(3x^2-6)(2-4x^3) + (-12x^2)(x^3-6x)$

$6x^2 - 12x^5 - 12 + 24x^3 - 12x^5 + 72x^3$

$-24x^5 + 96x^3 + 6x^2 - 12$

18) $h(x) = \dfrac{4x^2}{x^3+3}$

$\dfrac{8x(x^3+3) - 4x^2(3x^2)}{(x^3+3)^2}$

$8x^4 + 24x - 12x^4$

$\dfrac{-4x^4 + 24x}{(x^3+3)^2}$

19) $w(x) = \dfrac{3x + x^4}{2x^2 + 1}$

$\dfrac{(3+4x^3)(2x^2+1) - (3x+x^4)(4x)}{(2x^2+1)^2}$

$\dfrac{6x^2 + 3 + 8x^5 + 4x^3 - 12x^2 - 4x^5}{(2x^2+1)^2}$

$\dfrac{4x^5 + 4x^3 - 6x^2 + 3}{(2x^2+1)^2}$

20) $t(x) = (4x^2 - x)(x^3 - 8x^2 + 12)$

$(8x-1)(x^3-8x^2+12) + (3x^2-16x)(4x^2-x)$

$8x^4 - 64x^3 + 96x - x^3 + 8x - 12 + 12x^4 - 3x^3 - 64x^3 + 16x^2$

$20x^4 - 132x^3 + 16x^2 + 104x - 12$

21) $r(x) = \dfrac{\sqrt{x} + 2x}{7x - 4x^2}$ or $x^{1/2} + 2x$

$\dfrac{\left(\frac{1}{2}x^{-1/2} + 2\right)(7x-4x^2) - (7-8x)(\sqrt{x}+2)}{(7x-4x^2)^2}$

$\dfrac{\frac{7}{2}x^{1/2} - 2x^{3/2} + 14x - 8x^2 - 7x^{1/2} - 14x + 8x^{3/2} + 16x^2}{(7x-4x^2)^2}$

$\dfrac{8x^2 - 2\sqrt[2]{x^3} + 4.5\sqrt{x}}{(7x-4x^2)^2}$