1. Find the derivative of

$$\sqrt{7 + 2\tan\left(\frac{\pi x}{4}\right)}.$$

2. With $f(x) = e^{2\,x+3}$ and $g(x) = 5\,x^3 + 2$, find the derivative of the composition $f(g(x))$.

○ $\dfrac{\pi \sec^2\left(\frac{\pi x}{4}\right)}{4\sqrt{2\tan\left(\frac{\pi x}{4}\right)+7}}$

○ $\dfrac{1}{\sqrt{2\tan\left(\frac{\pi x}{4}\right)+7}}$

○ $\sqrt{\dfrac{1}{2}\pi \sec^2\left(\frac{\pi x}{4}\right)+7}$

○ $\tan\left(\dfrac{\pi}{4\sqrt{2\,x+7}}\right)$

○ $e^{30\,x^2+3}$

○ $2\,e^{2\,(5\,x^3+2)+3}$

○ $40\,e^{6\,x+9}+2$

○ $30\,e^{2\,(5\,x^3+2)+3}\,x^2$

3. What is $f'(x)$ if $f(x) = 20\, x^{\sqrt{5}\,-3} + 8\, x^{-3-\sqrt{158}} - 7\, x^{-3-\sqrt{7}} + 8\, x^{3/2}$?

○ $21\left(\sqrt{5} - 4\right) x^{\sqrt{5}-5} +$

$9\left(-4 - \sqrt{158}\right) x^{-5-\sqrt{158}} -$

$6\left(-4 - \sqrt{7}\right) x^{-5-\sqrt{7}} + \dfrac{9}{2\sqrt{x}}$

○ $20\left(\sqrt{5} - 3\right) x^{\sqrt{5}-4} +$

$8\left(-3 - \sqrt{158}\right) x^{-4-\sqrt{158}} -$

$7\left(-3 - \sqrt{7}\right) x^{-4-\sqrt{7}} + 12\sqrt{x}$

○ $20\left(\sqrt{5} - 2\right) x^{\sqrt{5}-3} +$

$8\left(-2 - \sqrt{158}\right) x^{-3-\sqrt{158}} -$

$7\left(-2 - \sqrt{7}\right) x^{-3-\sqrt{7}} + 20\, x^{3/2}$

○ $17\sqrt{5}\; x^{16} +$

$\dfrac{10\sqrt{7}}{x^{11}} - 5\sqrt{158}\; x^4 + \dfrac{45\, x^4}{2}$

4. Find the derivative of $\dfrac{3+7\,x+x^2}{e^{2+5\,x}}$.

○ $e^{-10\,x-4}\left(e^{5\,x+2}(2\,x + 7) - 5\,e^{5\,x+2}\left(x^2 + 7\,x + 3\right)\right)$

○ $e^{-5\,x-2}(2\,x + 7) - 5\,e^{-5\,x-2}\left(x^2 + 7\,x + 3\right)$

○ $\dfrac{1}{5}\,e^{-5\,x-2}$
$\left(5\,e^{5\,x+2}\left(x^2 + 7\,x + 3\right) + e^{5\,x+2}(2\,x + 7)\right)$

○ $\dfrac{1}{5}\,e^{-5\,x-2}(2\,x + 7)$