**MATHEMATIQUES**

Devoir autocorrigé

Calculer la dérivée des fonctions suivantes et factoriser quand c’est possible.

1. 

<table>
<thead>
<tr>
<th>fonction</th>
<th>Dérivée</th>
<th>factorisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) = x^2 + 2x + 1 )</td>
<td>( f^{(1)}(x) = 2x + 2 )</td>
<td></td>
</tr>
<tr>
<td>( g(x) = \frac{x^2 + 3x + 1}{x + 1} )</td>
<td>( g^{(1)}(x) = \frac{1}{(x + 1)^2}(2x + x^2 + 2) )</td>
<td></td>
</tr>
<tr>
<td>( h(x) = \frac{x + 2}{5x + 1} )</td>
<td>( h^{(1)}(x) = \frac{9}{(5x + 1)^2} )</td>
<td></td>
</tr>
<tr>
<td>( i(x) = \sqrt{2x + 1} )</td>
<td>( i^{(1)}(x) = \frac{1}{\sqrt{2x + 1}} )</td>
<td></td>
</tr>
<tr>
<td>( k(x) = \frac{\sqrt{2x + 1}}{x - 3} )</td>
<td>( k^{(1)}(x) = \frac{1}{(x - 3)^2} \frac{x + 4}{\sqrt{2x + 1}} )</td>
<td></td>
</tr>
<tr>
<td>( l(x) = x^2\sqrt{2x + 1} )</td>
<td>( l^{(1)}(x) = \frac{5x^2 + 2x}{\sqrt{2x + 1}} = (5x + 2)\frac{1}{\sqrt{2x + 1}} )</td>
<td></td>
</tr>
<tr>
<td>( m(x) = x^3 - 2x^2 + x + 1 )</td>
<td>( m^{(1)}(x) = 3x^2 - 4x + 1 = (3x - 1)(x - 1) )</td>
<td></td>
</tr>
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2. 

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<tr>
<td>( f(x) = x^3 - 4x + 1 )</td>
<td>( f^{(1)}(x) = 3x^2 - 4 )</td>
<td>( 3(x - \frac{2}{\sqrt[3]{5}})(x + \frac{2}{\sqrt[3]{5}}) )</td>
</tr>
<tr>
<td>( g(x) = \frac{x^3}{3} - 5x^2 - 4x + 1 )</td>
<td>( g^{(1)}(x) = (x^2 - 10x - 4) )</td>
<td>( (x - 5 + \sqrt[3]{29})(x - 5 - \sqrt[3]{29}) )</td>
</tr>
<tr>
<td>( h(x) = \frac{x^3}{3} - x^2 + x + 1 )</td>
<td>( h^{(1)}(x) = x^2 - 2x + 1 )</td>
<td>( (x - 1)^2 )</td>
</tr>
<tr>
<td>( i(x) = \frac{4x^3}{3} - x^2 + 4x + 1 )</td>
<td>( i^{(1)}(x) = (x^2 - 2x + 4) )</td>
<td></td>
</tr>
<tr>
<td>( j(x) = \frac{x^2 + 3}{2x + 1} )</td>
<td>( j^{(1)}(x) = \frac{2}{(2x + 1)^2} \frac{x + x^2 - 3}{(x + x^2 + 3)} )</td>
<td>( 2(x + \frac{1}{2} + \frac{1}{2}\sqrt[3]{13})(x + \frac{1}{2} - \frac{1}{2}\sqrt[3]{13}) )</td>
</tr>
<tr>
<td>( k(x) = \frac{2x - 2}{x^2 + x + 1} )</td>
<td>( k^{(1)}(x) = -\frac{2(x^2 - 2x - 2)}{(x + x^2 + 1)^2} )</td>
<td>( 2(x - 1 - \sqrt[3]{3})(x - 1 + \sqrt[3]{3}) )</td>
</tr>
<tr>
<td>( l(x) = (x^2 + 2x + 2)^2 )</td>
<td>( l^{(1)}(x) = 4(2x + x^2 + 2)(x + 1) )</td>
<td></td>
</tr>
<tr>
<td>( m(x) = (x^2 - 2x + 5)^3 )</td>
<td>( m^{(1)}(x) = 6(x^2 - 2x + 5)^2(x - 1) )</td>
<td></td>
</tr>
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</table>