

Name: \_\_\_\_\_ Score: \_\_\_\_\_

Teacher: \_\_\_\_\_ Date: \_\_\_\_\_

## Antiderivative

For questions 1 through 8, find the antiderivative  $F(x)$  of each function  $f(x)$ .

<p>1. <math>f(x) = 15x^2 + 4x + 3</math> <math>F(x) = 5x^3 + 2x^2 + 3x + C</math></p>	<p>2. <math>f(x) = 2x + 4</math> <math>F(x) = x^2 + 4x + C</math></p>
<p>3. <math>f(x) = 5x^4 + 4x^5</math> <math>F(x) = x^5 + \frac{2}{3}x^6 + C</math></p>	<p>4. <math>f(x) = x + 12x^2</math> <math>F(x) = \frac{1}{2}x^2 + 4x^3 + C</math></p>
<p>5. <math>f(x) = \frac{1}{\sqrt{x}}</math> <math>F(x) = 2x^{\frac{1}{2}} + C</math></p>	<p>6. <math>f(x) = (\sqrt{x})^5</math> <math>F(x) = \frac{2}{7}x^{\frac{7}{2}} + C</math></p>
<p>7. <math>f(x) = x^{\frac{1}{3}} + (2x)^{\frac{1}{3}}</math> <math>F(x) = \frac{3}{4}x^{\frac{4}{3}}(1 + \sqrt[3]{2}) + C</math></p>	<p>8. <math>f(x) = \frac{1}{x^2} + x</math> <math>F(x) = \frac{1}{2}x^2 - \frac{1}{x} + C</math></p>

For questions 9 and 10, find the function given the derivative

<p>9. Determine <math>f(x)</math> given that <math>f'(x) = 6x^8 - 20x^4 + x^2 + 9</math> <math>\frac{2}{3}x^9 - 4x^5 + \frac{1}{3}x^3 + 9x + C</math></p>	<p>10. Determine <math>h(t)</math> given that <math>h'(t) = t^4 - t^3 + t^2 + t - 1</math>. <math>\frac{1}{5}t^5 - \frac{1}{4}t^4 + \frac{1}{3}t^3 + \frac{1}{2}t^2 - t + C</math></p>
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Evaluate each of the following indefinite integrals.

<p>11. <math>\int 6x^5 - 18x^2 + 7 dx</math> <math>x^6 - 6x^3 + 7x + C</math></p>	<p>12. <math>\int 40x^3 + 12x^2 - 9x + 14 dx</math> <math>10x^4 + 4x^3 - \frac{9}{2}x^2 + 14x + C</math></p>
<p>13. <math>\int 12t^7 - t^2 - t + 3 dt</math> <math>\frac{3}{2}t^8 - \frac{1}{3}t^3 - \frac{1}{2}t^2 + 3t + C</math></p>	<p>14. <math>\int 10w^4 + 9w^3 + 7w dw</math> <math>2w^5 + \frac{9}{4}w^4 + \frac{7}{2}w^2 + C</math></p>
<p>15. <math>\int z^6 + 4z^4 - z^2 dz</math> <math>\frac{1}{7}z^7 + \frac{4}{5}z^5 - \frac{1}{3}z^3 + C</math></p>	<p>16. <math>\int (4\sqrt{x} + \sqrt[4]{x}) dx</math> <math>\frac{8}{3}x^{\frac{3}{2}} + \frac{4}{5}x^{\frac{5}{4}} + C</math></p>