This print-out should have 25 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001　10.0 points

Find the value of $f'(4)$ when

$$f(x) = \frac{5}{3}x^{3/2} - 2x^{1/2}.$$

1. $f'(4) = 4$

2. $f'(4) = \frac{11}{2}$

3. $f'(4) = \frac{9}{2}$

4. $f'(4) = 5$

5. $f'(4) = 6$

002　10.0 points

Find the value of $f'(-1)$ when

$$f(x) = -6x^2 - 2x^7 + 9.$$

003　10.0 points

Find the derivative of

$$f(x) = 4x^{\frac{1}{4}} - 5x^{-\frac{1}{4}} - 4.$$

1. $f'(x) = \dfrac{4x^{\frac{1}{2}} + 5}{4x^{\frac{5}{4}}}$

2. $f'(x) = \dfrac{4x^{\frac{1}{2}} - 5}{4x^{\frac{3}{4}}}$

3. $f'(x) = \dfrac{4x^{\frac{1}{4}} + 5}{4x^{\frac{3}{4}}}$

4. $f'(x) = \dfrac{4x^{\frac{1}{2}} - 5}{4x^{\frac{5}{4}}}$

5. $f'(x) = \dfrac{4x^{\frac{1}{2}} + 5}{3x^{\frac{5}{4}}}$

004　10.0 points

Find the derivative of

$$f(x) = \frac{\sqrt{5}}{x^5}.$$

1. $f'(x) = \dfrac{5\sqrt{5}}{x^6}$

2. $f'(x) = \dfrac{5\sqrt{5}}{x^4}$

3. $f'(x) = -\dfrac{6\sqrt{5}}{x^6}$

4. $f'(x) = -\dfrac{5\sqrt{5}}{x^6}$

5. $f'(x) = \dfrac{\sqrt{5}}{5x^4}$

005　10.0 points

Find the derivative of f when

$$f(x) = 3x^{\frac{5}{2}} + 2x^{-\frac{3}{2}} - \frac{1}{x}.$$

1. $f'(x) = \dfrac{15x^{\frac{7}{2}} - 6x^{-\frac{1}{2}} + 2}{2\,x^2}$

2. $f'(x) = \dfrac{9x^{\frac{7}{2}} + 6x^{-\frac{3}{2}} + 2}{2\,x^2}$

3. $f'(x) = \dfrac{15x^{\frac{7}{2}} - 6x^{-\frac{1}{2}} - 1}{x^2}$

4. $f'(x) = \dfrac{15x^{\frac{5}{2}} - 2x^{-\frac{1}{2}} - 2}{2\,x^2}$

5. $f'(x) = \dfrac{9x^{\frac{5}{2}} - 2x^{-\frac{3}{2}} + 1}{2\,x^2}$

006　10.0 points

Find the derivative of f when

$$f(x) = \sqrt{x}(2x - 1).$$

1. $f'(x) = \dfrac{4x - 1}{x\sqrt{x}}$

2. $f'(x) = \dfrac{6x + 1}{2\sqrt{x}}$

3. $f'(x) = \dfrac{4x + 1}{x\sqrt{x}}$

4. $f'(x) = \dfrac{6x - 1}{2\sqrt{x}}$

5. $f'(x) = \dfrac{6x + 1}{x\sqrt{x}}$

6. $f'(x) = \dfrac{4x - 1}{2\sqrt{x}}$

007　10.0 points

Determine the derivative of f when

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

1. $f'(x) = \dfrac{3}{1 + x^2}$

2. $f'(x) = \dfrac{3 - x^2}{(1 + x^2)^2}$

3. $f'(x) = \dfrac{3x^2 - 3}{(1 + x^2)^3}$

4. $f'(x) = \dfrac{3}{2x}$

5. $f'(x) = \dfrac{3(1 - x^2)}{(1 + x^2)^2}$

008　10.0 points

Find the value of $F'(4)$ when

$$F(x) = \frac{f(x)}{g(x)}$$

and

$$f(4) = -3, \qquad f'(4) = 4,$$

$$g(4) = 2, \qquad g'(4) = -3.$$

009　10.0 points

Determine $f'(x)$ when

$$f(x) = \frac{\sin(x) - 2}{\sin(x) + 3}.$$

1. $f'(x) = \dfrac{5\cos(x)}{(\sin(x) + 3)^2}$

2. $f'(x) = -\dfrac{5\cos(x)}{(\sin(x) + 3)^2}$

3. $f'(x) = \dfrac{5\sin(x)\cos(x)}{\sin(x) + 3}$

4. $f'(x) = -\dfrac{\cos(x)}{(\sin(x) + 3)^2}$

5. $f'(x) = -\dfrac{\sin(x)\cos(x)}{\sin(x) + 3}$

6. $f'(x) = \dfrac{\cos(x)}{\sin(x) + 3}$

010　10.0 points

Find the derivative of g when

$$g(x) = x^6 \cos(x).$$

1. $g'(x) = x^5 (6\sin(x) - x\cos(x))$

2. $g'(x) = x^6 (5\cos(x) - \sin(x))$

3. $g'(x) = x^5 (6\cos(x) + x\sin(x))$

4. $g'(x) = x^5 (6\sin(x) + x\cos(x))$

5. $g'(x) = x^6 (5\sin(x) - \cos(x))$

6. $g'(x) = x^5 (6\cos(x) - x\sin(x))$

011　10.0 points

Find the derivative of

$$f(x) = x^2 \sin(x) + 2x \cos(x).$$

1. $f'(x) = (x^2 - 2)\sin(x)$

2. $f'(x) = (2 + x^2)\sin(x)$

3. $f'(x) = (x^2 - 2)\cos(x)$

4. $f'(x) = (x^2 + 2)\cos(x)$

5. $f'(x) = (2 - x^2)\sin(x)$

6. $f'(x) = (2 - x^2)\cos(x)$

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012   10.0 points

Find the derivative of g when

$$g(x) = 9\sec(x) + \tan(x).$$

1. $g'(x) = 9\sec(x)\tan(x) + \sec^2(x)$

2. $g'(x) = 9\sec(x)\tan(x) + 1 - \tan^2(x)$

3. $g'(x) = 9\sin(x)\sec^2(x) - \cos^2(x)$

4. $g'(x) = 9\cos(x)\sec^2(x) + 1 + \tan(x)$

5. $g'(x) = 9\cos(x)\sec^2(x) + 1 - \sec(x)$

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013   10.0 points

Determine the derivative of

$$f(x) = x^2 \cos x - 2x \sin x.$$

1. $f'(x) = (x^2 - 2)\cos x$

2. $f'(x) = -(x^2 + 2)\sin x$

3. $f'(x) = (x^2 + 2)\cos x$

4. $f'(x) = -(x^2 - 2)\sin x$

5. $f'(x) = (x^2 + 2)\sin x$

6. $f'(x) = -(x^2 + 2)\cos x$

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014   10.0 points

Find the derivative of f when

$$f(x) = \frac{1 - 2\cos x}{\sin x}.$$

1. $f'(x) = \dfrac{\sin x - 2}{\cos^2 x}$

2. $f'(x) = -\dfrac{2 + \cos x}{\sin^2 x}$

3. $f'(x) = \dfrac{2\sin x - 1}{\cos^2 x}$

4. $f'(x) = \dfrac{2 - \cos x}{\sin^2 x}$

5. $f'(x) = \dfrac{1 - 2\cos x}{\sin^2 x}$

6. $f'(x) = \dfrac{2\sin x + 1}{\cos^2 x}$

7. $f'(x) = \dfrac{2 + \sin x}{\cos^2 x}$

8. $f'(x) = -\dfrac{1 + 2\cos x}{\sin^2 x}$

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015   10.0 points

Find the derivative of f when

$$f(x) = 4x\cos 5x.$$

1. $f'(x) = 20\cos 5x - 4x\sin 5x$

2. $f'(x) = 4\cos 5x + 20x\sin 4x$

3. $f'(x) = 20\cos 5x + 5x\sin 5x$

4. $f'(x) = 4\cos 4x - 4x\sin 5x$

5. $f'(x) = 4\cos 5x - 20x\sin 5x$

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016   10.0 points

Find $f'(x)$ when

$$f(x) = 2\cos(3x).$$

1. $f'(x) = -2\cos(3x)$

2. $f'(x) = -6\sin(3x)$

3. $f'(x) = 6\cos(3x)$

4. $f'(x) = 6\sin(3x)$

5. $f'(x) = 2\sin(3x)$

6. $f'(x) = -6\cos(3x)$

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017   10.0 points

Find the value of $f'(0)$ when

$$f(x) = (1-2x)^{-4}.$$

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018   10.0 points

Determine $f'(x)$ when

$$f(x) = \frac{1-2x}{\sqrt{1-x^2}}.$$

1. $f'(x) = \dfrac{x-2}{(1-x^2)^{3/2}}$

2. $f'(x) = \dfrac{2+x}{(1-x^2)^{3/2}}$

3. $f'(x) = \dfrac{2-x}{(1-x^2)^{3/2}}$

4. $f'(x) = \dfrac{x-2}{(1-x^2)^{1/2}}$

5. $f'(x) = \dfrac{2-x}{(1-x^2)^{1/2}}$

6. $f'(x) = \dfrac{2+x}{(1-x^2)^{1/2}}$

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019   10.0 points

Find $f'(x)$ when

$$f(x) = 4\cos 2x + 5\cos^2 x.$$

1. $f'(x) = 13\sin 2x$

2. $f'(x) = -13\cos 2x$

3. $f'(x) = -13\sin 2x$

4. $f'(x) = -26\cos 2x$

5. $f'(x) = 26\cos 2x$

6. $f'(x) = -26\sin 2x$

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020   10.0 points

Find the derivative of y when

$$y = 10\sin(\sqrt{x}) - 6\sqrt{x}\cos(\sqrt{x}).$$

1. $y' = 5\sin(\sqrt{x}) - 2\left(\dfrac{\cos(\sqrt{x})}{\sqrt{x}}\right)$

2. $y' = 3\sin(\sqrt{x}) - 8\left(\dfrac{\cos(\sqrt{x})}{\sqrt{x}}\right)$

3. $y' = 5\sin(\sqrt{x}) + 8\left(\dfrac{\sin(\sqrt{x})}{\sqrt{x}}\right)$

4. $y' = 3\cos(\sqrt{x}) + 8\left(\dfrac{\sin(\sqrt{x})}{\sqrt{x}}\right)$

5. $y' = 3\sin(\sqrt{x}) + 2\left(\dfrac{\cos(\sqrt{x})}{\sqrt{x}}\right)$

6. $y' = 5\cos(\sqrt{x}) - 2\left(\dfrac{\sin(\sqrt{x})}{\sqrt{x}}\right)$

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021   10.0 points

Find $f'(x)$ when

$$f(x) = \left(\frac{x}{3x^2+1}\right)^4.$$

1. $f'(x) = \dfrac{4(1-3x^2)}{(3x^2+1)^4}$

2. $f'(x) = \dfrac{4x^3(1-3x)}{(3x^2+1)^4}$

3. $f'(x) = \dfrac{x^3(1-3x)}{(3x^2+1)^4}$

4. $f'(x) = \dfrac{4(1-3x^2)}{(3x^2+1)^5}$

5. $f'(x) = \dfrac{4x^3(1-3x^2)}{(3x^2+1)^5}$

6. $f'(x) = \dfrac{x^3(1-3x^2)}{(3x^2+1)^5}$

022   10.0 points

Find all functions g such that

$$g'(x) = \frac{x^2+5x+2}{\sqrt{x}}.$$

1. $g(x) = 2\sqrt{x}\left(\dfrac{1}{5}x^2 + \dfrac{5}{3}x - 2\right) + C$

2. $g(x) = 2\sqrt{x}\left(x^2 + 5x - 2\right) + C$

3. $g(x) = \sqrt{x}\left(\dfrac{1}{5}x^2 + \dfrac{5}{3}x + 2\right) + C$

4. $g(x) = 2\sqrt{x}\left(x^2 + 5x + 2\right) + C$

5. $g(x) = 2\sqrt{x}\left(\dfrac{1}{5}x^2 + \dfrac{5}{3}x + 2\right) + C$

6. $g(x) = \sqrt{x}\left(x^2 + 5x + 2\right) + C$

023   10.0 points

Find the most general antiderivative, F, of the function

$$f(x) = 6x^2 - 16x + 3.$$

1. $F(x) = 2x^3 - 8x^2 + 3x$

2. $F(x) = 6x^3 - 16x^2 + 3x + C$

3. $F(x) = 2x^3 + 8x^2 + 3x$

4. $F(x) = 2x^3 + 8x^2 + 3x + C$

5. $F(x) = 2x^3 - 8x^2 + 3x + C$

024   10.0 points

Find $f(\pi/2)$ when

$$f'(t) = \cos\frac{1}{3}t - 6\sin\frac{2}{3}t$$

and $f(0) = 1$.

1. $f(\pi/2) = -2$

2. $f(\pi/2) = -3$

3. $f(\pi/2) = -1$

4. $f(\pi/2) = 0$

5. $f(\pi/2) = 1$

025   10.0 points

Determine the value of $f(2)$ when

$$f'(t) = t - 2, \qquad f(-1) = 3.$$