1. Evaluate:
$$\lim_{x\to 0}\frac{\sin(x)}{2x}$$

Solution. Given that the limit of $\frac{\sin(x)}{x}$ is 1 as $x \to 0$, we have

$$\begin{aligned}\lim_{x\to 0}\frac{\sin(x)}{2x} &= \lim_{x\to 0}\frac{\sin(x)}{x}\cdot\frac{1}{2}\\ &= 1\cdot\frac{1}{2}\\ &= \frac{1}{2}.\end{aligned}$$

$$\boxed{\frac{1}{2}}$$

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2. Find the second derivative of $g(x) = x^3 + 3x^2 + 3x + 1$.

Solution. We take the derivative of g twice.

$$\begin{aligned}g'(x) &= \frac{d}{dx}g(x)\\ &= \frac{d}{dx}(x^3 + 3x^2 + 3x + 1)\\ &= 3x^2 + 6x + 3 \implies\\ g''(x) &= \frac{d}{dx}g'(x)\\ &= \frac{d}{dx}(3x^2 + 6x + 3)\\ &= 6x + 6.\end{aligned}$$

$$\boxed{6x + 6}$$

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3. Find the derivative of $f(x) = \cot(x)\cos(x)$.

Solution. We use the product rule:

$$\begin{aligned} f'(x) &= \cot(x)\,\frac{d}{dx}(\cos(x)) + \frac{d}{dx}(\cot(x))\cos(x) \\ &= \cot(x)(-\sin(x)) + (-\csc^2(x))\cos(x) \\ &= \boxed{-\cos(x) - \cot(x)\csc(x)} \\ &= \boxed{-\frac{\cos(x)(\sin^2(x)+1)}{\sin^2(x)}} \\ &= \boxed{-\cos(x)(1+\csc^2(x))}. \end{aligned}$$