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1. (b) $\dfrac{x}{2y}$. (c) $\dfrac{x-y}{x+y}$. (f) $\dfrac{y-y^4}{3x+y^4}$. (l) $\dfrac{x/y}{|x/y|}$.
2. (a) $-\dfrac{y^2+x^2}{y^3} = \dfrac{-1}{y^3}$. (c) $\dfrac{\sqrt{y}+\sqrt{x}}{2x\sqrt{x}} = \dfrac{1}{2x\sqrt{x}}$.
3. (c) $|x|+\dfrac{x^2}{|x|}$. (f) $\dfrac{2x}{x^2+4}$. (g) $2x\ln|x|+x$. (h) $\cot x$. (j) $\dfrac{\sec x\tan x+\sec^2 x}{\sec x+\tan x} = \sec x$. (n) $\dfrac{e^{\sin^{-1}x}}{\sqrt{1-x^2}} + \dfrac{e^x}{\sqrt{1-e^{2x}}}$.
4. $\sin^{-1}x$ and $\cos^{-1}x$ are the two acute angles in the same right triangle, so their sum is $\dfrac{\pi}{2}$. $\dfrac{d}{dx}(\cos^{-1}x) = \dfrac{-1}{\sqrt{1-x^2}}$.
7. (a) $\frac{d}{dx}(\ln|x|) = \frac{1}{|x|}\cdot\frac{x}{|x|} = \frac{x}{x^2} = \frac{1}{x}$. (b) $\frac{d}{dx}\ln f(x) = \frac{1}{f(x)}f'(x) = \frac{f'(x)}{f(x)}$. (c) $\frac{d}{dx}\ln|f(x)| = \frac{1}{|f(x)|}\cdot\frac{f(x)f'(x)}{|f(x)|} = \frac{f(x)f'(x)}{f(x)^2} = \frac{f'(x)}{f(x)}$.
8. (c) $y\left(\dfrac{12x^2}{x^3+1} + \dfrac{12x^3}{x^4+1} - \dfrac{5}{x-1} - \dfrac{6}{x-2}\right)$.