**The method: Trig, exponential, and log derivatives**

$(\sin x)' = \cos x$, $(\cos x)' = -\sin x$, $(e^x)' = e^x$, $(\ln x)' = 1 \div x$. Use the chain and product rules with them.

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

product rule: $(x^2)' \sin x + x^2 (\sin x)'$

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

$f(x) = e^{2x} \qquad f'(x) = 2e^{2x}$

the derivative of $e^x$ is $e^x$; the chain rule gives the 2

$f'(x) = 2e^{2x}$

$f(x) = \ln(x + 4) \qquad f'(x) = \frac{1}{x + 4}$

$d/dx \ln u = u' \div u$

$f'(x) = \frac{1}{x + 4}$

**Problems 1 and 2 worked out · Version 0A**

$f(x) = x^2 e^x \qquad f'(x) = 2xe^x + x^2 e^x$

product rule: $(x^2)'$ times $e^x$, plus $x^2$ times $(e^x)'$

$f'(x) = 2xe^x + x^2 e^x$

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

product rule: $(x^2)' \sin x + x^2 (\sin x)'$

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

**Trig, exponential, and log derivatives · Version 0A**

1) $2xe^x + x^2e^x$ 2) $2x \sin x + x^2 \cos x$ 3) $2e^{2x}$
4) $2xe^x + x^2e^x$ 5) $5\cos(5x)$ 6) $6e^{6x}$ 7) $6e^{6x}$
8) $2xe^x + x^2e^x$ 9) $2xe^x + x^2e^x$ 10) $2e^{2x}$
11) $\frac{-2}{-2x - 2}$ 12) $6\cos(6x)$ 13) $5e^{5x}$ 14) $4\cos(4x)$
15) $-5\sin(5x)$ 16) $4e^{4x}$ 17) $-3\sin(3x)$