Solve:

1) What is the derivative of $v(x) = \log_4 (\cos x)$?

$v(x) = \log_4 u$ $\quad u = \cos x$

$v'(x) = \frac{1}{u \cdot \ln 4} \cdot u'$ $\quad u' = -\sin x$

$= \frac{-\sin x}{\cos x \cdot \ln 4}$ or $\boxed{\frac{-\tan x}{\ln 4}}$

2) Given $p(x) = \log_8 x$.

What is $\frac{dp}{dx}$? $= \frac{1}{x \ln 8}$ or $\frac{1}{3x \ln 2}$

3) What is $\frac{d}{dx} \log_3 x$?

$= \frac{1}{x \ln 3}$

4) Given $d(x) = \log_9 x$.

What is $\frac{dd}{dx}$? $= \frac{1}{x \ln 9}$ or $\frac{1}{2x \ln 3}$

5) What is the derivative of $w(x) = e^{x^2 + x - 1}$?

$w(x) = e^u$ $\quad u = x^2 + x - 1$

$w'(x) = e^u \cdot u'$ $\quad u' = 2x + 1$

$= \boxed{(2x+1)e^{x^2+x-1}}$

6) Given $n(x) = 7^{x-2}$. What is $n'(x)$?

$= \ln 7 \cdot 7^{x-2}$

7) Given $w(x) = 4^{\sin x}$.

What is $\frac{dw}{dx}$? $\quad u = \sin x$

$w(x) = 4^u$ $\quad u' = \cos x$

$w'(x) = \ln 4 \cdot 4^u \cdot u'$

$= \boxed{\ln 4 \cdot \cos x \cdot 4^{\sin x}}$

8) Given $n(x) = e^{3x^2 + 5x + 4}$.

What is $\frac{dn}{dx}$? $\quad u = 3x^2 + 5x + 4$

$u' = 6x + 5$

$n(x) = e^u$

$n'(x) = e^u \cdot u'$

$= \boxed{(6x+5)e^{3x^2+5x+4}}$