Review:

- No word problems

1) $e^{(2-\ln 5)} = 2$

$\frac{e^2}{e^{\ln 5}} = \boxed{\frac{e^2}{5}}$

2) $e^{(5+3\ln 2)} =$

$e^5 \cdot e^{\ln(2^3)} =$

$8e^5$

3) $e^{-2\ln 6} =$

$e^{\ln 6^{-2}} = 6^{-2} = \boxed{\frac{1}{36}}$

4) $e^{(\ln 3 - \ln 5)}$

$= \frac{e^{\ln 3}}{e^{\ln 5}} = \boxed{\frac{3}{5}}$

5) $e^{(4+2\ln x)} = x^2 e^4$

Find $\frac{dy}{dx}$.

6) $y = \ln(2-3x)^5$

$y = 5\ln(2-3x)$

$5 \cdot \frac{u'}{u}$

$5 \cdot \frac{-3}{2-3x} = \boxed{\frac{15}{2-3x}}$

7) $y = \ln(\ln(x))$

$\frac{dy}{dx} \ln(u) = \frac{u'}{u}$

8) $y = 7^{\sin x}$

$y' = \cos x \, (\ln 7) \, 7^{\sin x}$

9) $y = 8^{(3x^2+1)}$

10) $y = \log_3$

13) $\int \frac{e^{3x}+1}{e^{3x}} dx =$

$\int \left(1 + \frac{1}{e^{3x}}\right) dx =$

$\int 1 + e^{-3x} dx =$

$\int 1\,dx + \int e^{-3x} dx =$

$x + \int e^{-3x} dx \qquad \left| e^{kx} = \frac{1}{k} e^{kx} \right.$

$= x - \frac{1}{3} e^{-3x} + C$

14) $\int \frac{e^{3x}}{e^{3x}+1} dx = \qquad u = e^{3x}+1$

$du = 3e^{3x}$

$\frac{1}{3} du = e^{3x}$

$\int \frac{1}{3}\left(\frac{1}{u}\right) du =$

$\frac{1}{3} \cdot \ln|u| + C =$

$\frac{1}{3} \ln|e^{3x}+1| + C$

15) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx =$ $\quad u = \sqrt{x}$

$du = \frac{1}{2\sqrt{x}}\,dx$

$2\,du = \frac{1}{\sqrt{x}}\,dx$

$\int 2e^{u}\,du =$

$\boxed{2e^{\sqrt{x}} + c}$

16) line tangent $y = e^{\sqrt{x}}$ at $(1, e)$

$y = e^{\sqrt{x}}$

$y' = \frac{1}{2\sqrt{x}} e^{\sqrt{x}} = \frac{e^{\sqrt{1}}}{2\sqrt{1}} = \frac{e}{2}$

$y - e = \frac{e}{2}(x - 1)$

17) $\int \frac{1}{2^{x}}\,dx =$ $\quad u = -x$

$du = -dx$

$\int 2^{-x}\,dx$

$\therefore \int -2^{u}\,du = \frac{-2^{u}}{\ln 2} + c = \boxed{\frac{-2^{-x}}{\ln 2} + c}$

18) $\int_0^3 \frac{2x}{x^2+3}\,dx$

$u = x^2 + 3$

$du = 2x\,dx$

$dx = \frac{du}{2x} = \frac{1}{2x}\,du$