Homework 1

d. $\int \frac{3}{2x+1}\,dx$

e. $\int \frac{-5}{6-10x}dx$

f. $\int 3(4x+1)^{-3}dx$

g. $\int \frac{(x+4)^2}{2x}dx$

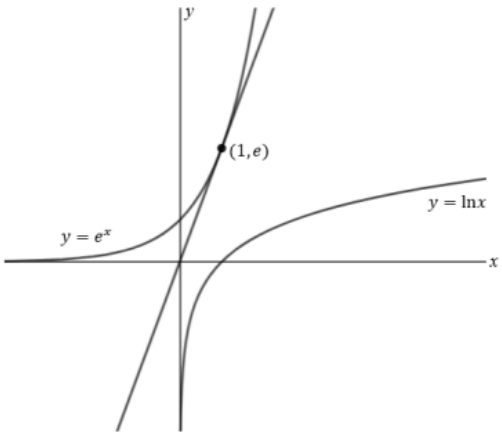
3. Determine the equation of the curve $f(x)$ given that:
   a. $f'(x) = (x+4)^3$ and the curve passes through $(-2, 5)$
   b. $f'(x) = 8(1-2x)^{-5}$ and $f(1) = 3$

15. A curve has a gradient function $f'(x) = \frac{k}{2x+3}$, where $k \in R$. It is known that the function has a gradient of 2 when $x = 1$.
   a. Determine the value of k.
   b. Hence, determine the general rule for the function $f(x)$.

QUESTION 15 (4 marks)

The graphs of $y = \ln x$ and $y = e^x$ are shown on the same axes below. The tangent to the curve $y = e^x$ at the point $(1, e)$ is also shown.

Determine the coordinates of the point on the graph of $y = \ln x$ where the gradient is parallel to the tangent shown.



QUESTION 9

The derivative of $y = e^{2x} \times \ln(3x)$ is

(A) $e^{2x}\left(2\ln(3x) + \frac{1}{x}\right)$

(B) $2e^{2x}\left(\ln(3x) + \frac{1}{x}\right)$

(C) $e^{2x}\left(\ln(3x) + \frac{1}{3x}\right)$

(D) $2e^{x}\left(2\ln(3x) + \frac{1}{x}\right)$