Author 1 _____ ☐

Author 2 _____ ☐

Author 3 _____ ☐

Author 4 _____ ☐

Worksheet 18

1. Find the following limits.

(a) $\lim_{x \to 1} \dfrac{x \sin(x-1)}{2x^2 - x - 1}$

(b) $\lim_{x \to \pi} \dfrac{1 + \cos x}{1 - \cos x}$

(c) $\lim_{x \to -\infty} x^2 e^x$

(d) $\lim_{x \to 0^-} \left(\dfrac{1}{x} - \dfrac{1}{e^x - 1} \right)$

2. Consider the limit $\lim_{x\to 0^+} (\cos x)^{1/x^2}$.

(a) What does "direct substitution" yield for the limit $\lim_{x\to 0^+} (\cos x)^{1/x^2}$?

(b) Find $\lim_{x\to 0^+} (\cos x)^{1/x^2}$ by using logarithms.

i. "Take ln" of both sides of $y = (\cos x)^{1/x^2}$ and use rules of logs to simplify.

ii. Take the limit as $x \to 0^+$ of your answer to the previous part to find $\lim_{x\to 0^+} \ln y$.

iii. Exponentiate your answer to the previous part to get your final answer for $\lim_{x\to 0^+} y$.