10.

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

Use proof by contradiction to show that for all angles x, where $90° < x < 180°$

$$\left| \frac{\cos 2x}{\cos x - \sin x} \right| < 1$$

(4)

8.
$$f(x) = (8 - 3x)^{\frac{4}{3}} \qquad 0 < x < \frac{8}{3}$$

(a) Show that the binomial expansion of $f(x)$ in ascending powers of x up to and including the term in x^3 is

$$A - 8x + \frac{x^2}{2} + Bx^3 + ...$$

where A and B are constants to be found.

(4)

(b) Use proof by contradiction to prove that the curve with equation

$$y = 8 + 8x - \frac{15}{2}x^2$$

does **not** intersect the curve with equation

$$y = A - 8x + \frac{x^2}{2} + Bx^3 \qquad 0 < x < \frac{8}{3}$$

where A and B are the constants found in part (a).

(*Solutions relying on calculator technology are not acceptable.*)

(4)

2.

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

The curve C_1 has equation

$$y = x^4 + 10x^2 + 8 \qquad x \in \mathbb{R}$$

The curve C_2 has equation

$$y = 2x^2 - 7 \qquad x \in \mathbb{R}$$

Use algebra to prove by contradiction that C_1 and C_2 do **not** intersect.

(4)