

**11** A curve has equation  $y = 3 \cos 2x + 2$  for  $0 \leq x \leq \pi$ .

**(a)** State the greatest and least values of  $y$ . [2]

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**(b)** Sketch the graph of  $y = 3 \cos 2x + 2$  for  $0 \leq x \leq \pi$ . [2]

**(c)** By considering the straight line  $y = kx$ , where  $k$  is a constant, state the number of solutions of the equation  $3 \cos 2x + 2 = kx$  for  $0 \leq x \leq \pi$  in each of the following cases.

**(i)**  $k = -3$  [1]

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**(ii)**  $k = 1$  [1]

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**(iii)**  $k = 3$  [1]

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$$\sigma(r) =$$

$$g(x) = f(2x) + 4,$$

$$h(x) = 2f\left(x + \frac{1}{2}\pi\right).$$

- [illegible]

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- This image shows a full page of white paper with ten horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and extend across the entire width of the page. There is no handwriting or other markings on the paper.