**1.** A curve $C$ has equation

$$y = 2 + 10x^{\frac{1}{2}} - 2x^{\frac{3}{2}} \qquad x > 0$$

(a) Find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$ giving your answer in simplest form.

**(3)**

(b) Hence find the exact value of the gradient of the tangent to $C$ at the point where $x = 2$ giving your answer in simplest form.

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

**(2)**

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**Question 1 continued**

**(Total for Question 1 is 5 marks)**

**2.** The points $P$, $Q$ and $R$ have coordinates $(-3, 7)$, $(9, 11)$ and $(12, 2)$ respectively.

(a) Prove that angle $PQR = 90°$

**(3)**

Given that the point $S$ is such that $PQRS$ forms a rectangle,

(b) find the coordinates of $S$.

**(2)**

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