| Question | Scheme | Marks |
|---|---|---|
| 3.(a) | $\frac{\mathrm{d}y}{\mathrm{d}x} = -\frac{1}{t^2}$ | B1 |
| | $y - \frac{c}{t} = -\frac{1}{t^2}(x - ct)$ | M1 |
| | $\Rightarrow x = ..., y = ...$ | M1 |
| | $A(2ct, 0)$ **and** $B\left(0, \frac{2c}{t}\right)$ | A1 |
| | | (4) |
| (b) | $\frac{1}{2} \times 2ct \times \frac{2c}{t} = 90 \Rightarrow c = ...$ | M1 |
| | $c^2 = 45 \Rightarrow c = 3\sqrt{5}$ | A1cso |
| | | (2) |
| | | **(Total 6 marks)** |

**Notes**

(a)

**B1:** Correct $\frac{\mathrm{d}y}{\mathrm{d}x}$ in terms of $t$. May be implied at the point of substitution into the equation if only found in terms of $x$ and/or $y$ initially. Allow if just stated, no working needed (may have been memorised). You may see attempts where this is derived but they must get to or imply the correct derivative in terms of $t$.

**M1:** Correctly forms the equation of the tangent. If no working for the gradient is shown accept $m = \pm\frac{1}{t^2}$ for this mark. If using $y = mx + c$ they must proceed at least as far as finding $c$.

**M1:** Uses their "tangent" (which must be a straight line equation) to find the non-zero coordinates of $A$ and $B$. Both must be attempted.

**A1:** Both correct. Accept $A$, $x = 2ct$, $B$, $y = \frac{2c}{t}$ or list as separate coordinate as long as it is clear, but just $\left(2ct, \frac{2c}{t}\right)$ is A0. If coordinates are labelled the wrong way award A0 but allow both marks in (b).

(b)

**M1:** Uses their coordinates and the "90" correctly to form and solve an equation for $c$.

**A1cso:** Correct value for $c$ (must be simplified surd so $3\sqrt{5}$). Must have come from correct coordinates. A0 if the negative root is also given (and not rejected).