Question	Scheme	Marks
2.(a)	$kx^2 - y^2 = 9$	
	$\frac{x^2}{9/k} - \frac{y^2}{9} = 1 \Rightarrow a^2 = \frac{9}{k}, b^2 = 9$ or Focus (6, 0) $\Rightarrow 6 = ae$	**B1**
	$\frac{x^2}{9/k} - \frac{y^2}{9} = 1 \Rightarrow a^2 = \frac{9}{k}, b^2 = 9$ and Focus (6, 0) $\Rightarrow 6 = ae$	**M1**
	E.g. $b^2 = a^2(e^2 - 1) \Rightarrow 9 = a^2\left(\frac{36}{a^2} - 1\right) = 36 - a^2 \Rightarrow a^2 = ...(27) \Rightarrow k = ...$ or $b^2 = a^2(e^2 - 1) \Rightarrow 9 = \frac{36}{e^2}(e^2 - 1) \Rightarrow 9e^2 = 36e^2 - 36 \Rightarrow e^2 = ...\left(\frac{36}{27}\right) \Rightarrow k = ...$ $b^2 = a^2(e^2 - 1) \Rightarrow 9 = \frac{9}{k}\left(\frac{36k}{9} - 1\right) = 36 - \frac{9}{k} \Rightarrow k = ...$	**M1**
	$\left(\Rightarrow \frac{9}{k} = 27\right) \Rightarrow k = \frac{1}{3}$	**A1**
		(4)
(b)	E.g. $a = "\sqrt{27}"$, directrix is $x = \pm\frac{a}{e} \Rightarrow (x =) \pm\frac{"\sqrt{27}"}{6/\sqrt{27}} = ...$	**M1**
	$x = \frac{9}{2}$	**A1**
		(2)
		(6 marks)

Notes

(a)

B1: Either Correctly identifies b^2 and a^2 (or b and a) in terms of k for the hyperbola (may be implied). (isw if they put $\pm...$ square rooting.) May be implied by working. May be seen in (b)

Or Uses the focus to set up a correct equation relating a and e or k and e. Note that $a^2 + b^2\left(= (ae)^2\right) = 36$ is an alternative correct equation. May be implied by working.

M1: Both of the above correctly attempted or implied in the working but accept $a^2 = 9k$ or $\frac{k}{9}$ as an attempt (and similar for b^2).

M1: Full method to find k using $b^2 = a^2\left(e^2 - 1\right)$ with their $ae = 6$ and their a and b. E.g. uses the eccentricity equation with their b and with their a or e in terms of a, e, or k appropriately, to set up and solve an equation in one variable, reaching a value for k. Condone confusion between a and a^2 or b and b^2 when substituting into the formulae for this mark.

A1: Correct k

(b)

M1: Full method to find $(\pm)\frac{a}{e}$ using their a and e (finding these if not already seen) or k. They must be using their a correctly, M0 if they have correctly identified a^2 but use it incorrectly here. Allow if $\pm$ is used and/or the x is missing for this mark.

A1: Correct equation only from fully correct work, and must be an equation not just value. A0 if $\pm$ given, they must be choosing the positive to correspond to the focus.