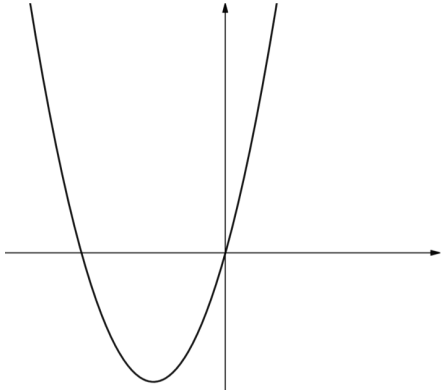
Question	Scheme	Marks	AOs
12(a)			
	$\cup$ shaped not $\cap$ shaped.	B1	1.1b
	Crosses the negative x-axis.	B1	1.1b
	Crosses the x-axis at the origin.	B1	1.1b
		(3)	

Notes:

Look out for the sketch drawn on Figure 5 but Diagram 1 takes precedence.

(a) Ignore any values given at intersection/turning points.

B1: $\cup$ shaped curve not $\cap$ shaped. Ignore any roots or lack of roots.

B1: At least one intersection with the negative x-axis. (May be a straight line)
Allow their curve/line to touch for this mark.

B1: A curve intersecting the origin. (May be a straight line)
Allow their curve/line to touch for this mark.

(b)	Correctly identifies $\left(\frac{dy}{dx} =\right) 3x^2 + 9x$ with one correct justification (see below)	B1	2.2a
	It is a positive quadratic with a negative root and a root at the origin.	dB1	2.4

(b)

B1: Deduces that the gradient function is $\left(\frac{dy}{dx} =\right) 3x^2 + 9x$ with one valid justification (see below)

Allow correct calculations for either roots $x = -3$ or $x = 0$ or for the turning point at $x = -\frac{3}{2}$ as a valid justification.

dB1: Explanation that includes

- one root being negative or e.g. has a root at $x = -3$ with no implication of there being more than one negative root
- one root being at the origin (or O) e.g. has a root at $x = 0$ (condone the y intercept is 0 but **not** "it doesn't have a y intercept")
- that it is U shaped (or a positive parabola/quadratic or it is the derivative of a positive cubic but **not** "positive graph/curve")

Alternatively, allow a complete explanation eliminating each of the other equations.

e.g. can't be:

- $(x+1)^2 - 2$ as this doesn't go through the origin
- $-x(x+7)$ as this is not a U shape
- $x^2 - 5x$ as this doesn't have a negative root

Or e.g.

- the curve has a turning point in quadrant 3 or is at $\left(-\frac{3}{2}, -\frac{27}{4}\right)$
- one root is at the origin

If extra incorrect statements are included they can be ignored.

Note B0dB1 is not possible.