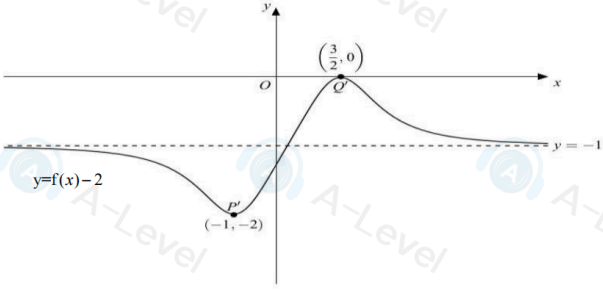
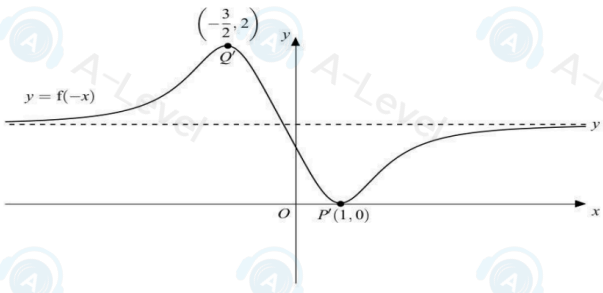


Question Number	Scheme	Marks
2(a)	$\text{Gradient} = \frac{8-5}{7\sqrt{3}-(-2\sqrt{3})} \text{ o.e.}$ $\text{e.g. } \Rightarrow \frac{3}{9\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{9}$	M1 A1
		(2)
(b)	$\frac{1}{9}\sqrt{3} \rightarrow -\frac{9}{\sqrt{3}}$ $y-5 = "-\frac{9}{\sqrt{3}}"(x+2\sqrt{3})$ $y = -3\sqrt{3}x - 13$	B1ft M1 A1
		(3)
		(5 marks)

Question	Scheme	Marks
4(i)		<p>Correct shape, translated down. B1</p> <p>Correct horizontal asymptote labelled B1</p> <p>Correct maximum and minimum points labelled B1</p>
		(3)
(ii)		<p>Correct shape, reflected in y axis B1</p> <p>Correct horizontal asymptote labelled B1</p> <p>Correct maximum and minimum points labelled. B1</p>
		(3)
		(6 marks)
Notes:		

Question Number	Scheme	Marks
7(a)	$-1 < x < 2$	M1A1
	$x < -4, x > 3$	B1
		(3)
(b)	$(x =) 1.5$	B1
		(1)
(c)(i)		B1B1B1
(ii)	$-3, x, -2$	B1
		(4)
		(8 marks)

Question Number	Scheme	Marks
9 (a)	$x \dots -5$	B1 (1)
(b)	$f(x) = (x+5)(3x^2 - 4x + 20) = 3x^3 + 11x^2 + 100$ $f'(x) = 9x^2 + 22x$	M1 M1 A1cso (3)
(c)	Finds $f'(-4) = 9 \times (-4)^2 + 22 \times -4 = (56)$ Sets $f'(x) = "9x^2 + 22x" = "56"$ $9x^2 + 22x - 56 = 0 \Rightarrow x = \frac{14}{9}, (-4)$	M1 dM1 ddM1 A1cso (4)
(d)(i)	$(-1, 84)$	B1
(ii)	$(-4, 336)$	B1 (2)
		(10 marks)

Question Number	Scheme	Marks
1. (a)	Attempts gradient = $\frac{20 - -4}{-5 - 3} = (-3)$ Attempts equation of line $y - 20 = "-3"(x + 5)$ or $y + 4 = "-3"(x - 3)$ $y = -3x + 5$	M1 dM1 A1 (3)
(b)	Gradient $\frac{1}{3}$ or midpoint $(-1, 8)$ $y - 8 = \frac{1}{3}(x + 1)$ $x - 3y + 25 = 0$	B1ft M1 A1 (3) (6 marks)

Question Number	Scheme	Marks
1. (a)	$y = 2x^3 - 5x^2 - \frac{3}{2x} + 7 \Rightarrow \frac{dy}{dx} = 6x^2 - 10x + \frac{3}{2x^2}$	M1 A1 A1 (3)
(b)	$x = \frac{1}{2} \Rightarrow y = 3$ Substitutes $x = \frac{1}{2}$ into their $\frac{dy}{dx} = 6x^2 - 10x + \frac{3}{2x^2} = \dots \left(= \frac{5}{2} \right)$ Uses the perpendicular gradient rule Eg. $\frac{5}{2} \rightarrow -\frac{2}{5}$ Attempts the equation of the normal at P $y - 3 = -\frac{2}{5} \left(x - \frac{1}{2} \right)$ $2x + 5y - 16 = 0$ oe	B1 M1 dM1 M1 A1 (5) (8 marks)

Question Number	Scheme	Marks
6. (a)	$(540^\circ, -5)$	B1, B1 (2)
(b) (i)	$(360^\circ, 3)$	B1, B1 (2)
(ii)	$(180^\circ, 5)$	B1, B1 (2) (6 marks)