

## Answers

Essential Skills 5	
1	maximum @ (0, 0); minimum @ (2, -4)
2	maximum @ (-2, 16); minimum @ (2, -16)
3	maximum @ (-4, -34); minimum @ (-2, -38)
4	maximum @ $(\frac{1}{3}, \frac{125}{27})$ ; minimum @ (2, 0)
5	maximum @ (-2, 61); minimum @ (3, -64)
6	maximum @ (0, 0); minimum @ (1, -1)
7	maximum @ $(-\frac{2}{3}, \frac{67}{27})$ ; minimum @ (2, -7)
8	maximum @ $(\frac{4}{3}, \frac{4}{27})$ ; minimum @ (2, 0)
9	minimum @ (-3, -54); maximum @ (3, 54)
10	maximums @ (-1, 2) & (1, 2); minimum @ (0, 0)
AQ	(1) (a) proof (b) $x = 6; V = 288\text{cm}^3$ (2) maximum 18 @ $x = 3$ ; minimum -2 @ $x = 1$

Essential Skills 6	
1	$x \leq 0, x \geq 4$
2	$-11 \leq x \leq -3$
3	$x < 4, x > 5$
4	$1 < x < 8$
5	$x \leq -4, x \geq 4$
6	$-3 \leq x \leq 3$
7	$-3 < x < \frac{1}{2}$
8	$-7 \leq x \leq 1$
9	$x \leq \frac{1}{2}, x \geq \frac{5}{2}$
10	$x \leq -\frac{2}{3}, x \geq 3$
AQ	1. $x < -4; x > \frac{2}{3}$ . $-2 < k < 6$ 3. $k < -6, k > \frac{2}{5}$

Essential Skills 7	
1	$3(x + 1)^2 - 2$
2	$2(x + 3)^2 - 21$
3	$5(x - 1)^2 - 12$
4	$3(x - 3)^2 - 23$
5	$4(x + 3)^2 - 33$
6	$2(x - 5)^2 - 55$
7	$19 - (x + 4)^2$
8	$13 - 8(x - 1)^2$
9	$2(x - 2)^2 - 10$
10	$3(x + \frac{3}{2})^2 - \frac{23}{4}$
AQ	(a) $2(x - 5)^2 + 4$ (b) $\frac{dy}{dx} > 0$ for all x, always increasing

Essential Skills 8	
1	$3y + 4x + 6 = 0$
2	$y - x + 4 = 0$
3	$y + x - 3 = 0$
4	$y + 3x - 10 = 0$
5	$3y - x + 15 = 0$
6	$3y + 4x - 22 = 0$
7	$5y - x - 13 = 0$
8	$y - x - 3 = 0$
9	$x = -1$
10	$y = 3$
AQ	(a) (1, 5) (b) $3y + 4x - 19 = 0$