Quadratic Theory 1 (answers)

1.

(a) $(x+3)^2-12$ (b) $(x-\frac{5}{2})^2-5\frac{1}{4}$ (c) $3(x+2)^2-10$

(d) $2(x-\frac{3}{2})^2-8\frac{1}{2}$ (e) $20-(x-4)^2$ (f) $3-2(x+1)^2$

or $-(x-4)^2+20$ *or* $-2(x+1)^2+3$

2. (a) $f(x)=2(x-4)^2-25$, $a=2,\ p=-4,\ q=-25$

min value of -25 @ $x = 4$

(b) $g(x)=(\sin\alpha-\frac{1}{2})^2-\frac{5}{4}$, $p=-\frac{1}{2}$ *and* $q=-\frac{5}{4}$

min value of $-\frac{5}{4}$ @ $\alpha=\frac{\pi}{6}$

3. (a) $k=-1$

(b) i) $p=-4$ *or* $p=-2$ ii) $-4<p<-2$

(c) proof (discriminant a perfect square)

4. (a) Proof

(b) $k=-3$ *or* $k=2$

Quadratic Theory 2 (answers)

1. (a) proof (b) $t\le 0$ or $t\ge 4$

2. $-5 < t < -1$

3. (a) $f(x) = \dfrac{3p}{(x-9)^2+6}$, $\therefore$ $f_{\max} = \dfrac{3p}{6} = \frac{1}{2}p$ (b) $f_{\max} == \dfrac{\sqrt{2}-1}{1} = ans.$

4. (a) $(\sin\theta+1)^2 - 4$, $\therefore$ $a=1$ *and* $b=-4$ (b) $\theta=\dfrac{3\pi}{2}$

5. $h=\frac{1}{25}\left(2500-x^2\right)$

6. b cannot lie between -4 *and* 4