2(a) vertically $s = ut + 0.5gt^2$

$0 = 200\sqrt{2}\sin 45.t - 0.5(10)t^2$ 5

$t = \frac{400}{g}$ or 40 s 5

horizontally $s = ut + 0.5gt^2$

$= 200\sqrt{2}\cos 45(40) + 0$ 5

$= 8000$ m 5

short of q by 1333.3 m or 4/3 km 5 25

(b) If they meet after t seconds then

$200\sqrt{2}\cos 45.t + \frac{1000}{3}\cos A.t$ 5

$= 9333.3$ 5

$200t + \frac{800}{3}t = 9333.3$

$1400t = 28000$

$t = 20$ s 5

Height above the ground $= 200\sqrt{2}\sin 45.t - 0.5gt^2$ 5

$= 200(20) - 5(400)$

$= 4000 - 2000$

$= 2000$ m 5 25