2007 **3.** **(a)** A particle is projected with a speed of $7\sqrt{5}$ m/s at an angle α to the horizontal.

Find the two values of α that will give a range of 12.5 m.

$r_j = 0$

$7\sqrt{5}\sin\alpha.t - \frac{1}{2}gt^2 = 0$ — 5

$\Rightarrow t = \dfrac{14\sqrt{5}\sin\alpha}{g}$ — 5

Range $= 7\sqrt{5}\cos\alpha.t$

$= 7\sqrt{5}\cos\alpha.\left(\dfrac{14\sqrt{5}\sin\alpha}{g}\right)$ — 5

$= 50\sin\alpha\cos\alpha$

$= 25\sin 2\alpha$

Range $= 12.5$

$25\sin 2\alpha = 12.5$

$\sin 2\alpha = \dfrac{1}{2}$ — 5

$\Rightarrow 2\alpha = 30°$ or $150°$

$\Rightarrow \alpha = 15°$ or $75°$ — 5

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