

PROBLEMS

1. A particle of mass m moves in a straight line with constant acceleration a . It starts from rest at the origin. Find its velocity and displacement after time t .

2. A particle is projected vertically upwards with an initial velocity u . Find the time it takes to reach a height h and the time it takes to return to the ground.

3. A particle is projected from the top of a cliff of height H with an initial velocity u . Find the time it takes to reach the ground.

4. A particle is projected from the ground with an initial velocity u at an angle θ to the horizontal. Find the time it takes to reach a height h and the time it takes to return to the ground.

5. A particle is projected from the ground with an initial velocity u at an angle θ to the horizontal. Find the range of the particle.

Time	Velocity	Displacement
0	0	0
t	at	$\frac{1}{2}at^2$
$\frac{u}{a}$	u	$\frac{u^2}{2a}$
$\frac{2u}{a}$	0	$\frac{u^2}{a}$
$\frac{3u}{a}$	$-u$	$\frac{3u^2}{2a}$
$\frac{4u}{a}$	$-2u$	$\frac{2u^2}{a}$
$\frac{5u}{a}$	$-3u$	$\frac{5u^2}{2a}$
$\frac{6u}{a}$	$-4u$	$\frac{3u^2}{a}$
$\frac{7u}{a}$	$-5u$	$\frac{7u^2}{2a}$
$\frac{8u}{a}$	$-6u$	$\frac{4u^2}{a}$
$\frac{9u}{a}$	$-7u$	$\frac{9u^2}{2a}$
$\frac{10u}{a}$	$-8u$	$\frac{5u^2}{a}$
$\frac{11u}{a}$	$-9u$	$\frac{11u^2}{2a}$
$\frac{12u}{a}$	$-10u$	$\frac{6u^2}{a}$
$\frac{13u}{a}$	$-11u$	$\frac{13u^2}{2a}$
$\frac{14u}{a}$	$-12u$	$\frac{7u^2}{a}$
$\frac{15u}{a}$	$-13u$	$\frac{15u^2}{2a}$
$\frac{16u}{a}$	$-14u$	$\frac{8u^2}{a}$
$\frac{17u}{a}$	$-15u$	$\frac{17u^2}{2a}$
$\frac{18u}{a}$	$-16u$	$\frac{9u^2}{a}$
$\frac{19u}{a}$	$-17u$	$\frac{19u^2}{2a}$
$\frac{20u}{a}$	$-18u$	$\frac{10u^2}{a}$

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0	0	0
t	at	$\frac{1}{2}at^2$
$\frac{u}{a}$	u	$\frac{u^2}{2a}$
$\frac{2u}{a}$	0	$\frac{u^2}{a}$
$\frac{3u}{a}$	$-u$	$\frac{3u^2}{2a}$
$\frac{4u}{a}$	$-2u$	$\frac{2u^2}{a}$
$\frac{5u}{a}$	$-3u$	$\frac{5u^2}{2a}$
$\frac{6u}{a}$	$-4u$	$\frac{3u^2}{a}$
$\frac{7u}{a}$	$-5u$	$\frac{7u^2}{2a}$
$\frac{8u}{a}$	$-6u$	$\frac{4u^2}{a}$
$\frac{9u}{a}$	$-7u$	$\frac{9u^2}{2a}$
$\frac{10u}{a}$	$-8u$	$\frac{5u^2}{a}$
$\frac{11u}{a}$	$-9u$	$\frac{11u^2}{2a}$
$\frac{12u}{a}$	$-10u$	$\frac{6u^2}{a}$
$\frac{13u}{a}$	$-11u$	$\frac{13u^2}{2a}$
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$\frac{15u}{a}$	$-13u$	$\frac{15u^2}{2a}$
$\frac{16u}{a}$	$-14u$	$\frac{8u^2}{a}$
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