

# Acceleration

$$A = (V_f - V_i)/(t_f - t_i)$$

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$V_i$ (m/s)	Direct'n $V_i$	$V_f$ (m/s)	$A$ (m/s <sup>2</sup> )	Direct'n $A$	Speed up/slo down
15		0			
-10		0			
1		5			
30		30			
-25		-5			
-11		-15			

- If Acceleration and Velocity have the same sign, the motion is speeding up.
- If Acceleration and Velocity have opposite signs, the motion is slowing down.
- If Acceleration and Velocity are at 90 degrees with respect to each other, the motion is circular motion.

# Motion in a straight line and uniformly accelerated motion

- 1.  $V_{\text{avg}} = (V_i + V_f)/2$
- 2.  $V_f = V_i + A \times t$
- 3.  $D = V_i \times t + \frac{1}{2} \times A \times t^2$
- 4.  $V_f^2 = V_i^2 + 2 \times A \times D$
  
- (N.B. #4 has no time; #3 has time)

# Dropping a stone off a cliff

- $D = V_i \times t + \frac{1}{2} \times A \times t^2$
- $V_i = 0$
- Top of cliff set at zero and ground below at negative position,  $g = -9.8 \text{ m/s}^2$
- $-D = \frac{1}{2} \times (-9.8) \times t^2$        $t = \sqrt{2D/9.8}$