Instant vs Time Interval

Physics with Tiaotiao 跳跳 · Kinematics · High School Physics

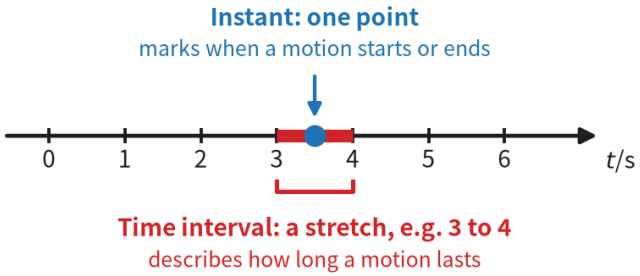
Study sheet for the video "Instant vs Time Interval": key ideas and practice questions (answers are in a separate answer key)

Key ideas

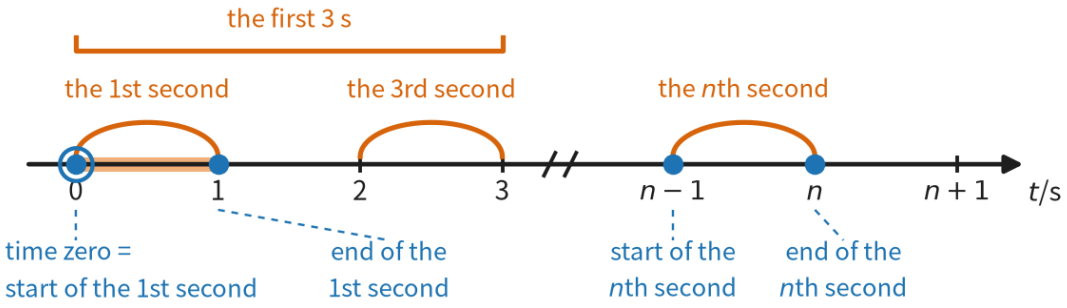
In daily life, "time" means two things: a point in time (5:00, 3 a.m.) or a stretch of time (2 days, half an hour). Physics gives them two different names.

Instant: a single point in time, **one point** on the time axis. It marks when a motion starts or ends.
A photo records what happened at one instant.

Time interval: a stretch of time, **one segment** of the time axis. It describes how long a motion lasts.
1 s, 1 h, 1 day, three days and three nights: all time intervals.

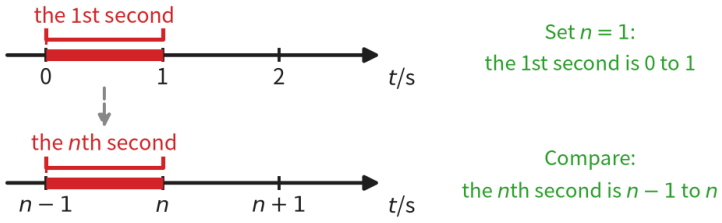


Commonly tested



There is no "0th second". The time axis starts at 0, so the very first stretch, 0 to 1, is the 1st second. But there *is* a time zero (an instant).

Trick for "*n*th" questions: if you get stuck, **set *n* = 1**. The 1st second is 0 to 1, so the *n*th second is *n*−1 to *n*.



Practice

Try these first. The answers are in a separate answer key.

1. Warm-up. A pupil wrote a diary letter to his dad. Is each phrase an instant (I) or a time interval (T)?

_____ (1) "it should already be 5:00"
_____ (2) "for the last 2 days"
_____ (3) "from 7:00 in the morning to 12:00 at night"
_____ (4) "more than ten hours straight"
_____ (5) "startled me awake at 3 a.m."
_____ (6) "took half an hour to fall asleep again"
_____ (7) "I slept for forty minutes in math class"

2. Which of the following timing data refers to a time interval? ( )

A typical Grade 10 exam question in China.

A. CCTV's news broadcast lasts 30 min

B. The Hong Kong handover took effect at 0:00 on 1 July 1997

C. The Beijing Olympics opening ceremony began at 8 p.m. on 8 August 2008

D. At 21:16:03 on 29 September 2011, Tiangong-1 was launched from the Jiuquan Satellite Launch Center

Answer: _____ Why?

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3. Fill in. Time intervals or instants?

(1) the 3rd second: _____ (2) the first 3 s: _____ (3) the end of the 1st second: _____

(4) time zero: _____ (5) the start of the *n*th second: _____

(6) The *n*th second runs from _____ to _____ .

4. For the time axis shown, which statement about instants and time intervals is correct? ( )



A. t_2 is an instant, called the end of the 2nd second or the start of the 3rd second, and can also be called "within 2 s"

B. t_2 to t_3 is a time interval, called the 3rd second

C. t_0 to t_2 is a time interval, called the first 2 s or the 2nd second

D. t_{n-1} to t_n is a time interval, called the (n−1)th second

Answer: _____ Why are the others wrong?

One-line summary

An instant is a point; a time interval is a stretch. The *n*th second is *n*−1 to *n* (stuck? set *n* = 1), and there is no 0th second.

Key terms

Term	Meaning	Chinese
instant	one point on the time axis	时刻 shíkè
time interval	a stretch (segment) of the time axis	时间（间隔） shíjiān (jiàngé)
time axis	a line that shows time *t* in seconds	时间轴 shíjiānzhóu
time zero	the instant *t* = 0, the start of the 1st second	零时刻 líng shíkè
the *n*th second	the stretch from *n*−1 to *n*	第 *n* 秒 dì *n* miǎo
the first 3 s	the stretch from 0 to 3	前 3 秒 qián sān miǎo
the end of the 1st second	the instant *t* = 1 s	第 1 秒末 dì yī miǎo mò