

Calculus Section 3.7 Application Problems with Derivatives

Lesson 273 | Calculus AB | Average and instantaneous rates • Related rates

<https://www.youtube.com/watch?v=vsd4O2F8jbl>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

Position is $s(t)=10t^2+6t$ for $t \geq 0$. Find average velocity on $[3,4]$ and instantaneous velocity at $t=3$.

02

A sphere radius increases at 6 cm/s. At radius 7 cm, find dV/dt .

03

Position is $s(t)=3t^2+4t$ for $t \geq 0$. Find average velocity on $[4,5]$ and instantaneous velocity at $t=4$.

Calculus Section 3.7 Application Problems with Derivatives

Lesson 273 | Calculus AB | Average and instantaneous rates • Related rates

<https://www.youtube.com/watch?v=vsd4O2F8jbl>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

04

A sphere radius increases at 9 cm/s. At radius 5 cm, find dV/dt .

05

Position is $s(t)=2t^2+10t$ for $t \geq 0$. Find average velocity on $[5,6]$ and instantaneous velocity at $t=5$.

06

A sphere radius increases at 5 cm/s. At radius 2 cm, find dV/dt .

Calculus Section 3.7 Application Problems with Derivatives

Lesson 273 | Calculus AB | Average and instantaneous rates • Related rates

<https://www.youtube.com/watch?v=vsd4O2F8jbl>

Original practice aligned to the saved video title.

01

Position is $s(t)=10t^2+6t$ for $t \geq 0$. Find average velocity on $[3,4]$ and instantaneous velocity at $t=3$.

Average = $[s(4)-s(3)]/1=76$. Differentiate: $v(t)=20t+6$; $v(3)=66$.

02

A sphere radius increases at 6 cm/s. At radius 7 cm, find dV/dt .

$V=(4/3)\pi r^3$. Differentiate in time: $dV/dt=4\pi r^2 dr/dt$. Substitute after differentiation: 1176π cm^3/s .

03

Position is $s(t)=3t^2+4t$ for $t \geq 0$. Find average velocity on $[4,5]$ and instantaneous velocity at $t=4$.

Average = $[s(5)-s(4)]/1=31$. Differentiate: $v(t)=6t+4$; $v(4)=28$.

Calculus Section 3.7 Application Problems with Derivatives

Lesson 273 | Calculus AB | Average and instantaneous rates • Related rates

<https://www.youtube.com/watch?v=vsd4O2F8jbl>

Original practice aligned to the saved video title.

04

A sphere radius increases at 9 cm/s. At radius 5 cm, find dV/dt .

$V = (4/3)\pi r^3$. Differentiate in time: $dV/dt = 4\pi r^2 dr/dt$. Substitute after differentiation: 900π cm³/s.

05

Position is $s(t) = 2t^2 + 10t$ for $t \geq 0$. Find average velocity on $[5, 6]$ and instantaneous velocity at $t = 5$.

Average = $[s(6) - s(5)]/1 = 32$. Differentiate: $v(t) = 4t + 10$; $v(5) = 30$.

06

A sphere radius increases at 5 cm/s. At radius 2 cm, find dV/dt .

$V = (4/3)\pi r^3$. Differentiate in time: $dV/dt = 4\pi r^2 dr/dt$. Substitute after differentiation: 80π cm³/s.