MATH 152 Calculus II
Instructor: Michael Monagan.

Assessment.

8 assignments 15% (best 7 of 8) due Tuesdays @ 11pm
3 midterms 15% each (dates posted on Canvas)
1 final exam 40%.

A1 A2 M1 A3 A4 M2 A5 A6 M3 A7 A8 Final.

Each assignment covers 4 lectures.
8–12 hours / assigment.
~ 15 exercises on Webassign. 1% (10 shots).
~ 10 written exercises paper/tablet (upload Crowdmark)
↳ Group. assignments for A1 A2.

Help? Calculus Workshop. AQ 4110 (See Canvas for hours)

Review of Derivatives

$f(x)$	$f'(x)$
x^n	nx^{n-1}
$u(x) + v(x)$	$u'(x) + v'(x)$
$u(x) \cdot v(x)$	$u'(x)\cdot v(x) + v'(x)\cdot u(x)$
$c \cdot u(x)$	$0\cdot u(x) + u'(x)\cdot c = \underline{c\cdot u'(x)}$
$g(u(x))$	$g'(u(x))\cdot u'(x)$
$u(x)/v(x)$	$\dfrac{u'(x)\cdot v(x) - v'(x)\cdot u(x)}{v(x)^2}$
$u(x)\cdot v(x)^{-1}$	

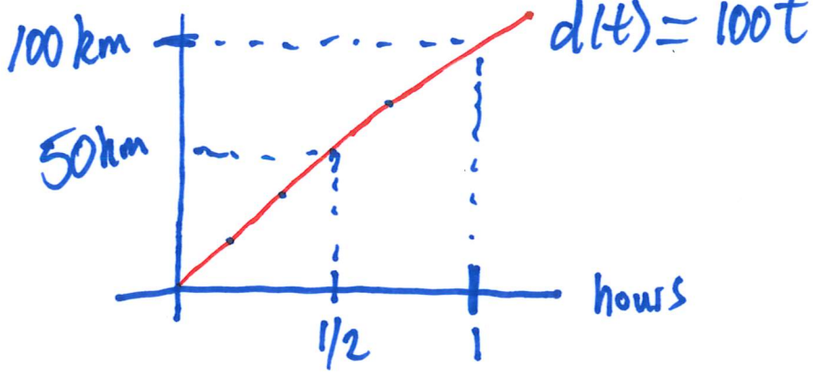
$f(x)$	$f'(x)$
x^2	$2x^1$
$\sqrt{x} = x^{1/2}$	$\frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}$
$\sin x + \cos x$	$\cos x + (-\sin x)$.
$(x^2)\cdot \ln x$	$(2x)\ln x + \frac{1}{x}\cdot(x^2)$
$2\sin x$	$2\cdot\cos x$
$\underset{g}{\sin}\underset{u}{(2x)}$	$\cos(2x)\cdot 2$ $g(u)\cdot u'$
$\tan x$	$\sec^2 x$.

$$\tan x = \frac{\sin x}{\cos x} \qquad \frac{\cos x\cdot\cos x - -\sin x\cdot\sin x}{\cos^2 x}$$

$$= (\underline{\cos^2 x} + \underline{\sin^2 x})/\cos^2 x = \frac{1}{\cos^2 x} = \sec^2 x.$$

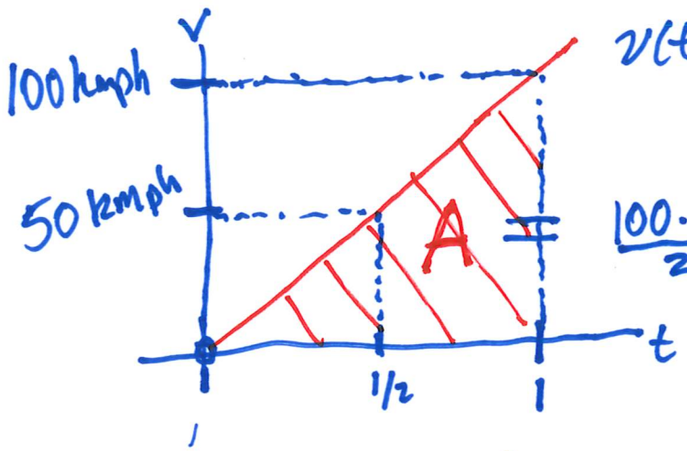
Q1 (a) $3x^2 + 2\cdot x^{-1}$ (b) $\ln(1-x) + x e^{-2x}$ (c) $\sqrt{1+x^2}$ (d) $\sin 2x - \dfrac{\cos x}{x}$

Let $v(t)$ be the velocity of an object (car) at time t (kmph).
Let $d(t)$ be the distance travelled at time t (km).
Then $\boxed{v(t) = d'(t)}$ ⊲



$d(t) = 100t$

After 1 hour we've gone 100 km.
So $V_{AVE} = 100$ kmph on $0 \le t \le 1$.
So $v(t) = 100$ kmph. ($d(t)$ is a straight line).
Notice $d'(t) = 100$.



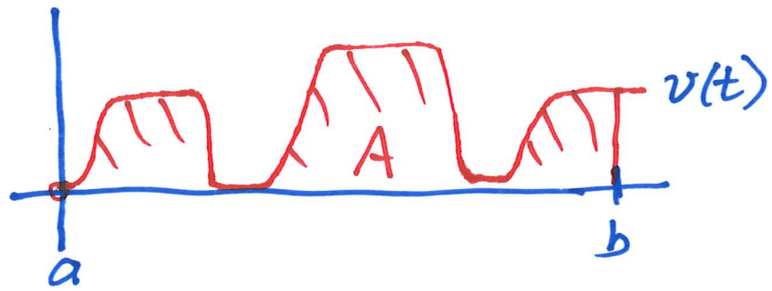
$v(t) = 100t$.

$A = \frac{100 \cdot 1}{2} = 50.$

How far does the car travel on $0 \le t \le 1$.
What is $d(1) - d(0)$?
$V_{AVE} = 50$ kmph. So
$d(1) - d(0) = \underline{50}$ km.

Notice $A = 50$ which is the distance. Is this a fluke?

Is it true that the distance travelled between $a \le t \le b$ is the area under $v(t)$ on $a \le t \le b$?

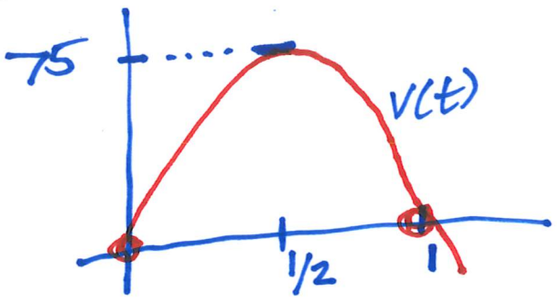


A car is travelling at $v(t)$ $300t(1-t)$ kmph for $0 \le t \le 1$.

What's the maximum velocity on $0 \le t \le 1$? CALC I derivative

How far does the car travel on $0 \le t \le 1$? CALC II. antiderivative.

Given $v(t) = 300t(1-t) = \boxed{300t - 300t^2}$



Vmax occurs when $v'(t) = 0$.

$v'(t) = 300 - 600t = 0 \Rightarrow t = \frac{1}{2}$.

$v(1/2) = 300 \cdot \frac{1}{2} \cdot \frac{1}{2} = 75$ kmph

Let $d(t)$ be the distance travelled at time t.

$v(t) = d'(t) = 300t - 300t^2$

antiderivative? $\longrightarrow$ $d(t) = 150t^2 - 100t^3$

$d(1) - d(0) = 150 \cdot 1^2 - 100 \cdot 1^3 - 0 = 50$ km.