Good afternoon:

warm up is to continue the properties of definite integrals problem from DS

Given

$$\int_2^4 f(x)\,dx = 12$$

$$\int_4^8 f(x)\,dx = -3$$

$$\int_4^2 g(x)\,dx = 5$$

Find

$$\int_8^2 6f(x)\,dx$$

next pg

$$\int_4^2 g(x) - 3f(x)\,dx$$

pg 3

$$\int_8^2 6f(x)\,dx$$

$$-\int_2^8 6f(x)\,dx$$

$$-6\int_2^8 f(x)\,dx$$

$$-6\left[\int_2^4 f(x)\,dx + \int_4^8 f(x)\,dx\right]$$

$$-6\,[12 + -3]$$

$$-6\,[9] = -54$$

$$\int_4^2 g(x) - 3f(x)\,dx$$

$$\int_4^2 g(x)\,dx - \int_4^2 3f(x)\,dx$$

$$5 - 3\int_4^2 f(x)\,dx$$

$$5 - 3 \cdot -\int_2^4 f(x)\,dx$$

$$5 + 3[12]$$

$$5 + 36 = \boxed{41}$$

Looking at motion algebraically

Find the position of an object moving along a horizontal axis at t=3 sec if its velocity is v(t)=2 sin(t) m/s and its initial position is 5 meters.

$\to x(0)=5$

$x(3)=?$

$p \to v \to a$, $\int$

$$\int v(t)\,dt = x(t)$$
$$\int 2\sin t\,dt = x(t)$$
$$-2\cos(t)+c = x(t)$$

Plug in, Find C

$$x(0)=5=-2\cos(0)+c$$
$$5=-2\cdot 1+c$$
$$7=c \to x(t)=-2\cos(t)+7$$

$$x(3)=-2\cos(3)+7$$
$$\approx 8.98\,m$$

Alt. Approach

Find the position of an object moving along a horizontal axis at t=3 sec if its velocity is v(t)=2 sin(t) m/s and its initial position is 5 meters.

FTC: $\int_a^b f'(x)\,dx = f(b) - f(a)$

$\int_a^b v(t)\,dt = x(b) - x(a)$

these are "t" values ...

$\int_0^3 v(t)\,dt = x(3) - x(0)$

$x(3) = x(0) + \int_0^3 v(t)\,dt$

$x(3) = 5 + \int_0^3 2\sin(t)\,dt$

$x(3) = 5 + \left[-2\cos(t)\right]_0^3$

$x(3) = 5 + \left[(-2\cos(3)) - (-2\cos(0))\right]$

$x(3) \approx 8.98$

The acceleration of a moving body is modeled by a(t)=6t meters/sec ^{2}. Find its position at t=2 if its initial velocity is 5 m/s and initial position is -3m.

$x(2) = ?$

$v(0) = 5$

$x(0) = -3$

$a(t) = 6t$

$\frac{dv}{dt} = 6t$

$\int dv = \int 6t\, dt$

$v = 3t^2 + C$

$v(0) = 5 = 3(0)^2 + C$

$5 = C$

$\Rightarrow v(t) = 3t^2 + 5$

$\frac{dx}{dt} = 3t^2 + 5$

$dx = 3t^2 + 5\, dt$

$\int dx = \int 3t^2 + 5\, dt$

$x(t) = t^3 + 5t + C$

$x(0) = -3 = 0^3 + 5(0) + C$

$-3 = C$

$\Rightarrow x(t) = t^3 + 5t - 3$

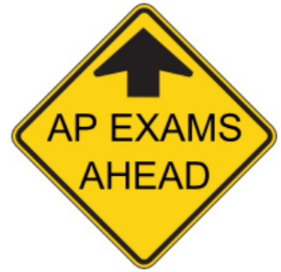
$x(2) = 2^3 + 5(2) - 3$

$8 + 10 - 3$

$15\ m$

Some Details about the AP Test

Tuesday May 15, 8am



50% of grade: Multiple Choice

- Part A: 30Q's 60 min, No Calculator
- Part B: 15Q's, 45 min, Calc OK

50% of grade: FRQ (Free Response Questions), 9 pt scale

- Part A: 2 Q's, 30 min, Calc ok
- Part B: 4Q's, 60 min, No Calculator

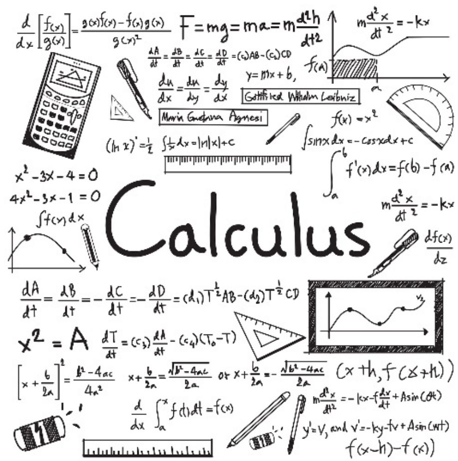
2016 Score Breakdown (of 108 pts available)

1: 0-34 pts	(0-32% of avail pts)	31% of students
2: 35-41 pts	(33-37% of avail pts)	9.7% of students
3: 42-54 pts	(38-50% of avail pts)	17.4% of students
4: 55-66 pts	(51-61% of avail pts)	17.3% of students
5: 67-108pts	(62-100% of avail pts)	24.8% of students

You can pass the test with getting half the pts!!!

Some Saturday in April:

a timed test in the morning, complete with coffee and donuts :)

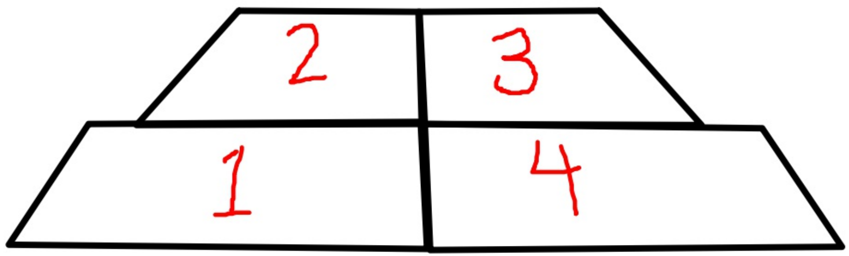


2017: 8 students took test I was confident could pass, 5 did

2016: slightly lower percentage, around 50% i think

I forgot the other ones -_-

front of room



Jigsaw

Each person at 'home' table has a different problem

Huddle up with 'expert groups' doing the same problem

Return to home group, walk partners through doing your task; ask questions of partner explaining theirs

HW

watch tonight's video on accumulation functions