

Good practice coming to the tutorial in week n

- Attempt Formative Assessment of week n-1
- " Mock Quiz of week n-1.

Support Learning Hour

Week 2 Thursday 2pm MB521

Starting from week 3 Wednesday (after class)  
1pm - 2pm.

# Formative Assessment #1

c.) Solve  $y' = \underbrace{2x + y - 5}_z$   $y' = f(ax + by + c)$   
 $a = 2$   $b = 1$   $c = -5$

Reducible to separable.

①  $z = ax + by + c$   $z = 2x + y - 5 \Rightarrow \boxed{y = z - 2x + 5}$

$\boxed{y' = f(z) = z}$

② We differentiate  $z = z(x)$  with respect to  $x$

$$z' = \frac{d}{dx} (2x + y - 5) = 2 + \frac{dy}{dx} \stackrel{= y'}{=} = 2 + y' = 2 + z$$

$$z' = 2 + z$$

$\boxed{\frac{dz}{dx} = 2 + z}$  separable!

③ Solve  $z' = 2 + z$  by separation of variables.

$$\int \frac{dz}{2+z} = \int dx + C'$$

LHS:  $H(z) = \int \frac{dz}{2+z} = \ln |z+2|$

RHS:  $F(x) = \int dx = x$

Implicit solution

$H(z) = F(x) + C'$   
 $\boxed{\ln |z+2| = x + C'}$

where  $C'$  is an arbitrary constant

$$|z+2| = e^{x+d} = e^d \cdot e^x$$

$$z+2 = \boxed{\pm e^d} e^x = D e^x$$

where  $D$  is an arbitrary constant  $D \in \mathbb{R}$

$$\boxed{z = D e^x - 2}$$

Explicit solution for  
 $z = z(x)$

④ Putting  $y = z - 2x + 5$

$$y = z = \underbrace{D e^x - 2}_{z} - 2x + 5 = D e^x - 2x + 3$$

$$\boxed{y(x) = D e^x - 2x + 3}$$

where  $D \in \mathbb{R}$

General solution for  
 $y = y(x)$