

$$\frac{dy}{dt} = \frac{0.01(-8\sqrt{y})}{4t} = -0.00636\sqrt{y}$$

$$\frac{dy}{\sqrt{y}} = -0.00636 dt$$

$$\int y^{-1/2} dy = \int -0.00636 dt$$

$$2y^{1/2} = -0.00636t + C$$

$$y^{1/2} = -0.00318t + C$$

$$y = (-0.00318t + 3)^2$$

$$4.5 = \dots$$

$$\sqrt{4.5} = -0.00318t + 3$$

$$t = 276$$

$$\frac{0}{0} \xrightarrow{LR} \frac{2x}{\sin x} \frac{0}{0} \xrightarrow{LR} \frac{2}{\cos x} \rightarrow 2$$

(D)

$$\int \frac{1}{x^2 - 7x + 10} dx = \frac{A}{(x-5)} + \frac{B}{(x-2)}$$

$$1 = A(x-2) + B(x-5)$$

$$x=2: 1 = B(-3) \quad B = -1/3$$

$$x=5: 1 = 3A \quad A = 1/3$$

$$\frac{1}{3} \ln|x-5| - \frac{1}{3} \ln|x-2| + C \quad \textcircled{E}$$

# Logistic equation

Carrying capacity  $A$

$$\frac{dy}{dt} \sim y \cdot \left(1 - \frac{y}{A}\right)$$

$$\frac{dy}{dt} = ky \left(1 - \frac{y}{A}\right)$$

solution  $\rightarrow$

$$y = \frac{A}{1 - ce^{-kt}} \quad \text{or}$$

$$\frac{A}{1 - e^{-kt}/c}$$

