

## 14.7) Working with natural logarithms

## Worked example

Solve the equation:

$$e^x = 2$$

$$e^x = 4$$

## Your turn

Solve the equation:

$$e^x = 5$$

$$x = \ln 5 = 1.609 \text{ (3 dp)}$$

## Worked example

Solve the equation:

$$e^{7x-2} = 3$$

Give your answer in exact form

## Your turn

Solve the equation:

$$e^{2x+3} = 7$$

$$x = \frac{1}{2} \ln 7 - \frac{3}{2}$$

## Worked example

Solve the equation:

$$e^{2x} + 2e^x = 15$$

## Your turn

Solve the equation:

$$e^{2x} + 5e^x = 14$$

$$x = \ln 2$$

## Worked example

Solve the equation:

$$e^x - 12e^{-x} = -1$$

## Your turn

Solve the equation:

$$e^x - 2e^{-x} = 1$$

$$x = \ln 2$$

## Worked example

Solve the equation:

$$3^x e^{x+4} = 2$$

Give your answer as an exact value

## Your turn

Solve the equation:

$$2^x e^{x+1} = 3$$

Give your answer as an exact value

$$x = \frac{\ln 3 - 1}{\ln 2 + 1}$$

## Worked example

Solve the equation:

$$\ln x = 2$$

$$\ln x = 4$$

## Your turn

Solve the equation:

$$\ln x = 5$$

$$x = e^5 = 148.413 \text{ (3 dp)}$$

## Worked example

Solve the equation:

$$3 \ln x - 7 = 5$$

## Your turn

Solve the equation:

$$2 \ln x + 1 = 5$$

$$x = e^2 = 7.389 \text{ (3 dp)}$$



## Worked example

Solve the equation:

$$\ln(2x - 3) = 1$$

## Your turn

Solve the equation:

$$\ln(3x + 1) = 2$$

$$x = \frac{e^2 - 1}{3}$$

## Worked example

Find the exact coordinates of the points where the graph with equation  $y = 6 + \ln(5 - x)$  intersects the axes

## Your turn

Find the exact coordinates of the points where the graph with equation  $y = 2 + \ln(3 - x)$  intersects the axes

$$(5 - e^{-6}, 0) \text{ and } (0, 2 + \ln 3)$$