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## Quiz 0

### Problem 1

Find the equation of a line that passes through the points  $P_1(-6, -3)$  and  $P_2(2, 4)$ .

### Problem 2

Find the equation of a line that passes through the point  $P_1(-6, -3)$  and has a slope 2.

### Problem 3

Find the slope and the  $y$ -intercept of the equation of a line:

$$x + 3y = 0.$$

### Problem 4

Solve for  $x$ :

$$4 = e^x.$$

### Problem 5

Find the equation of a vertical line passing through the point  $(5, 0)$ .

## Solutions

### Problem 1

The equation of a line is  $y = mx + b$  with  $m = \frac{y_2 - y_1}{x_2 - x_1}$  so

$$m = \frac{4 - (-3)}{2 - (-6)} = \frac{7}{8}$$

and we get

$$y = \frac{7}{8}x + b.$$

To calculate  $b$ , we substitute either point into the equation, for example  $x = 2, y = 4$ :

$$4 = \frac{7}{8}2 + b$$

from which  $b = \frac{9}{4}$ . The equation of a line is then:

$$y = \frac{7}{8}x + \frac{9}{4}.$$

### Problem 2

We are given the slope  $m = 2$  so:

$$y = 2x + b.$$

To calculate  $b$ , we substitute the point  $P_1$  into the equation and solve for  $b$ :

$$-3 = 2(-6) + b,$$

$$b = 9.$$

The equation of a line is then:

$$y = 2x + 9.$$

### Problem 3

We rewrite the equation to the form  $y = mx + b$ :

$$x + 3y = 0,$$

$$y = -\frac{1}{3}x.$$

So the slope is  $m = -\frac{1}{3}$  and y-intercept is 0.

### Problem 4

We apply the natural logarithm to both sides of the equation:

$$4 = e^x,$$

$$\ln 4 = \ln e^x$$

and use the identity  $\ln e^x = x$ :

$$x = \ln 4.$$

### Problem 5

The equation of such line is just:

$$x = 5.$$