

# MATH110 — Assignment 5

## Solutions

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### Question 1.

(a)  $x = 7/2$ .

(b) The quadratic formula gives two solutions,  $x = -4$  and  $x = -1$ .

(c) Take the  $-2/3$  power of both sides:

$$x = (x^{-3/2})^{-2/3} = 4^{-2/3}.$$

(d) Dividing both sides by 3 gives  $e^{2x} = 2/3$ . Taking logarithms of both sides:

$$2x = \ln\left(\frac{2}{3}\right) \quad \Rightarrow \quad x = \frac{1}{2} \ln\left(\frac{2}{3}\right).$$

(e) Rearranging gives  $\ln x = -3/4$ . Now exponentiating both sides gives

$$e^{\ln x} = e^{-3/4} \quad \Rightarrow \quad x = e^{-3/4}.$$

### Question 2.

Eliminating  $y$  gives

$$2x + 3 = -x + 5.$$

Rearranging gives  $x = 2/3$  and substituting into the first equation we get  $y = 13/3$ . (Note that we should get the same result if we substitute in the second equation. This provides a good way to check your answer.)

### Question 3.

Eliminating  $y$  gives

$$x + 3 = x^2 + 2x + 2.$$

Rearrangement gives  $x^2 + x - 1 = 0$  which has the solutions  $x = \frac{-1+\sqrt{5}}{2}$  and  $x = \frac{-1-\sqrt{5}}{2}$ . The corresponding values  $y = \frac{5+\sqrt{5}}{2}$  and  $y = \frac{5-\sqrt{5}}{2}$  are obtained by substituting the values of  $x$  into either of the original equations.