

# M1 Training Problems

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## 1 Linear equations, sketches and exact plots

1. Solve  $(4x - 2) - (2x - 1) = 3x$ . How many solutions does it have?
2. Solve  $(3x - 2) - (2x - 1) = x$ . How many solutions does it have?
3. Solve  $(4x - 1) - (2x - 1) = 2x$ . How many solutions does it have?
4. Solve for  $x$ .  $5x + 6 = 3x + 2$ . How many solutions does it have?
5. Solve for  $x$ .  $5x + 2 = 5x + 2$ . How many solutions does it have?
6. Solve for  $x$ .  $3x + 1 = 3x - 1$ . How many solutions does it have?
7. Sketch freehand, no ruler:  $y = x$ ,  $y = -x$ . Put them on the same axes. Remember to label everything.
8. Sketch freehand, no ruler:  $y = 2x$ ,  $y = -2x$ . Put them on the same axes.
9. Sketch freehand, no ruler.

$$y = \frac{x}{2}, \quad y = -\frac{x}{2}.$$

Put them on the same axes.

10. Sketch freehand, no ruler. Label everything.

$$y = 2x + 1.$$

11. Sketch freehand, no ruler. Label everything.

$$y = -2x - 1.$$

12. Sketch freehand, no ruler. Label everything.

$$y = -\frac{x}{2} + 3.$$

13. Sketch freehand, no ruler. Label everything.

$$y = \frac{x}{2} - 3.$$

14. Make an exact plot. Find the  $x$  and  $y$  intercepts. Show your work. Use a ruler.

$$y = 3x - 2.$$

15. Make an exact plot.

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

16. Consider the equation

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

- (a) Solve for  $x$  by algebra. How many solutions does it have?
- (b) Make exact plots of the left-hand side and right-hand side of the equation. Show where the solutions are.

17. Consider the equation

$$2x + 3 = 2x - 1.$$

- (a) Solve for  $x$  by algebra. How many solutions does it have?
- (b) Make exact plots of the left-hand side and right-hand side of the equation. Show where the solutions are. Make sure your plots match your algebra.

18. Consider the equation

$$-2x + 1 = -2x + 1.$$

- (a) Solve for  $x$  by algebra. How many solutions does it have?
- (b) Make exact plots of the left-hand side and right-hand side of the equation. Show where the solutions are. Make sure your plots tell the same story as your algebra.