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 $y = 3x - 2$.

(a) Make a freehand sketch, no ruler.
(b) Make an exact plot, with a ruler. Find intercepts.

17. 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.

18. 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.

19. 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.