SME M1
1/10 1/9 1/8
Practice Problems

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Sketch your graphs freehand. Don't use a ruler unless it's absolutely necessary. Use blank (no lines) paper if you have it. We are not trying to produce perfect graphs: we just want graphs that contain the essential ideas about a curve. Don't include details that are not important.

Make sure that you do the following:

- Plot the axes and label them.
- Label all the important features (lines, curves, points of intersection, etc.)
- Label and explain graph operations (shift, rotate, etc.)
- Give equations for your curves, and for each operation step.

1 Constant curves and points

1. On the same pair of axes, plot $y = 1$, $y = 5$ and $y = -3$.

2. Plot $x = -2$, $x = -1$ and $x = 5$ on the same axes.

3. Plot the point $P(1, 3)$ and show the constant lines. Give an interpretation of the symbol $(1, 3)$ in English.

4. Plot the point $Q(-3, -2)$ and give an interpretation in English. Show all important features of this graph, including the constant curves, axes, labels etc.

2 Shift operations

5. Start with $y = 5$ and plot $y = 5 + 1$ by doing a shift operation.

6. Start with $y = -2$ and do a shift operatio to get the graph of $y = -2 - 4 = -6$.

7. Do a shift on $x = a$, $a > 0$, to get the graph of $x = a - 2$.

8. Do a shift on $x = -a$, $a > 0$ to get the graph of $x = -a + 1$.

9. Start with $y = a$, $a > 0$, and do a LHS shift to get the graph of $y + 1 = a$.

10. Start with $x = -3$ and do a LHS shift to get the graph of $x - 4 = -3$.

11. Begin with $y = 5$ do a LHS shift and a RHS shift to get the graph of $y + 1 = 5 + 1$. Show both shift operations in your drawing.

12. Begin with $x = -5$. Do two shift operations: a LHS shift and a RHS shift to get $x + 2 = 5 - 1$. Show both operations in your graph drawing.

3 Stretch and shrink

4 Rotations