Revision

1. For what values of a are the points $A\left(\dfrac{6a+4}{2+a}, \dfrac{2a+8}{a+2}\right)$, $B(2,4)$ and $C(6,2)$ collinear.

2. Find the equation of the linear function $f(x)$ such that $f(2x) = 2f(x) - 1$ and $f(x+2) = 4 + f(x)$.

3. A linear function f is such that $f(1) + f(3) = 6$ and $f(2) + f(4) = 10$. Find $f(0)$.

4. For what values of m does the range of the function $f(x) = (3-5m)x - 4m$ consist of a single element?

5. Find the values of m for which the lines k and l intersect each other, when $k : x + y - m - 0$ and $l : 2x - y = 3$.

6. Find the values of m for which the lines k and l are parallel, when $k : x + my - 2 = 0$ and $l : 2x - 3y - m = 0$.

7. Find the values of m for which the lines k and l are perpendicular, when $k : 2x + 3y + 2 = 0$ and $l : x - my + m = 0$.

8. Find the values of p for which the lines k, l and m intersect at one point, where $k : x - 2y + 3 = 0$, $l : 2x + y + 6 = 0$ and $m : px - y - 2 = 0$.

9. Discuss the number of solutions to the equation:
$$|x - a| + |x + a| = b$$
depending on the parameters a and b.

10. Discuss the number of solutions to the equation:
$$|x - 1| - |x - 2| + |x - 3| = |m|$$
depending on the parameter m.

11. Find the values of a for which the system:

$$\begin{cases} |x| + |y| = 3 \\ y = 2x + a \end{cases}$$

has:

   a) exactly one solution,

   b) exactly two solutions.

12. Find the range of the function $f(x) = \dfrac{|x+2| + |x-2|}{x}$, where $x \in \mathbb{R} - \{0\}$.

13. Sketch the graph of $f(x) = \left|1 + \dfrac{1}{|2-x|}\right|$. Hence solve $f(x) = 2$.

14. The angle α is acute and $\operatorname{tg}\alpha = 2$. Find the value of $\dfrac{\sin\alpha + \cos\alpha}{\sin\alpha - \cos\alpha}$.