SYNTHETIC DIVISION

$f(-1) = 0$ , so $(x + 1)$is a factor

$f(-1) = 0$ $f(x) = 2x^3 - 2x^2 - 10x - 6$

| −1 | 2 | −2 | −10 | −6 |
|---|---|---|---|---|
| | | −2 | 4 | 6 |
| | 2 | −4 | −6 | 0 |

This method is called SYNTHETIC division, because we don't really divide.
We actually multiply and add.

Note the following:

- The $x$-value of $-1$ that gave us the factor $(x + 1)$ is written on the LHS
- The coefficients of the cubic polynomial are written in the top row
- The first coefficient, 2, is carried down to the last row
- Now starting from the left:
  MULTIPLY along the dotted arrow
  and write the ANSWER in the block one row up and one column right
  } repeat steps
- Now ADD DOWN in the column (the two values underneath each other)
- You MUST get 0 in the last block
- The 3 values in the bottom row are the coefficients of the quadratic factor.

So, $f(x) = (x + 1)(2x^2 - 4x - 6)$

You can now complete the factorising:

$f(x) = (x + 1)(2x + 2)(x - 3)$