

In an arithmetic sequence, the 9th term is 4 times the 5th term. The sum of the first 2 terms is -13. Find the 10th term

$$U_9 = U_1 + 8d$$

$$U_5 = U_1 + 4d$$

$$U_1 + 8d = 4(U_1 + 4d)$$

$$U_1 + 8d = 4U_1 + 16d$$

$$0 = 3U_1 + 8d$$

$$U_1 + U_2 = -13$$

$$U_1 + U_1 + d = -13$$

$$2U_1 + d = -13$$

$$3U_1 + 8d = 0$$

$$2U_1 + d = -13$$

$$6U_1 + 16d = 0$$

$$6U_1 + 3d = -39$$

$$13d = 39$$

$$d = 3$$

$$2U_1 + d = -13$$

$$2U_1 + 3 = -13$$

$$2U_1 = -16$$

$$U_1 = -8$$

$$U_{10} = U_1 + 9d$$

$$U_{10} = -8 + 9 \times 3$$

$$U_{10} = 19$$

Find the 9th term and the 5th term

the 9th term is 4 times the 5th term

The sum of the first 2 terms is -13

Solve the simultaneous equations

Eliminate  $U_1$

Substitute in one of equations

Find  $U_{10}$