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Arithmetic Progressions - Finding a and d given two terms

In an arithmetic progression, the 6th term is 2 and the 10th term is -14 .
Find the first term and the common difference.

$$a, a+d, a+2d, a+3d, a+4d, \dots \quad \text{where the } n^{\text{th}} \text{ term, } u_n = a + (n-1)d$$

$$\text{Given 6th term, } u_6 = 2 \quad \therefore 2 = a + 5d \quad \textcircled{1}$$

$$\text{10th term, } u_{10} = -14 \quad \therefore -14 = a + 9d \quad \textcircled{2}$$

$$\textcircled{1} - \textcircled{2} \text{ gives } 16 = -4d$$

$$\therefore d = \frac{16}{-4}$$

$$\therefore d = -4$$

$$\text{Sub. } d = -4 \text{ into } \textcircled{1}$$

$$\therefore 2 = a + 5(-4)$$

$$\therefore 2 = a - 20$$

$$\therefore a = 22$$

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