

**Find the 66th term in the sequence**

$$a_5=6, \quad a_8=15, \quad a_{10}=21, \quad a_{66}=\underline{\hspace{2cm}}?$$

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# Find the 66th term in the sequence

$$a_5=6, \quad a_8=15, \quad a_{10}=21, \quad a_{\textcolor{magenta}{66}}=\underline{\hspace{2cm}}$$

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$$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10} \quad a_{\textcolor{magenta}{66}} \\ \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{6}, \underline{\hspace{2cm}}, \underline{\hspace{2cm}}, \underline{15}, \underline{\hspace{2cm}}, \underline{21} \dots \underline{\hspace{2cm}} ?$$

# Find the 66th term in the sequence

$$a_5 = 6, \quad a_8 = 15, \quad a_{10} = 21, \quad a_{66} = ?$$

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$$\begin{array}{ccccccccc} a_1, & a_2, & a_3, & a_4, & a_5, & a_6, & a_7, & a_8, & a_9, & a_{10} & a_{66} \\ \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{6}, \underline{\hspace{0.5cm}}, \underline{\hspace{0.5cm}}, \underline{15}, \underline{\hspace{0.5cm}}, \underline{21} \dots & ? \end{array}$$

The diagram illustrates a sequence of terms with gaps. Orange brackets under the first four terms and the first two pairs of terms are labeled '+d'. A purple bracket under the last three terms is also labeled '+d'.

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$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{66}$   
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 6, \_\_\_\_\_, \_\_\_\_\_, 15, \_\_\_\_\_, 21 ... ?

$$6+d+d+d=15 \quad 15+d+d=21$$

$$6+3d=15 \quad 15+2d=21$$

$$3d=9$$

$$d=3$$

$$2d=6$$

$$d=3$$

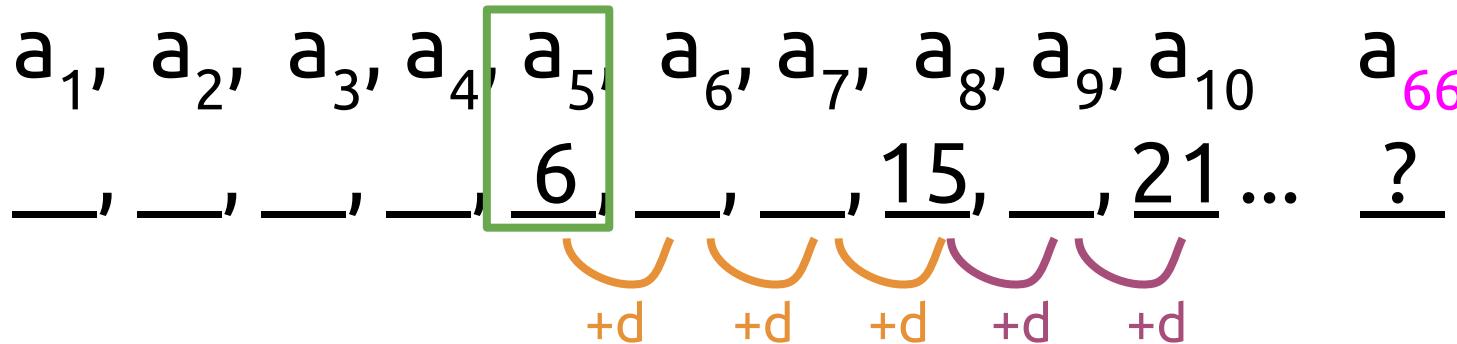
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$$6+3d=15 \quad 15+2d=21$$

$$3d=9$$

$$2d=6$$

$$d=3$$

$$d=3$$

$$a_n = dn + a_0$$

$$6 = 3(5) + a_0$$

$$6 = 15 + a_0$$

$$-9 = a_0$$

# Find the 66th term in the sequence

$$a_5 = 6,$$

$$a_8 = 15,$$

$$a_{10} = 21,$$

$$a_{66} = ?$$

$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{66}$   
\_\_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, 6, \_\_\_\_\_, \_\_\_\_\_, 15, \_\_\_\_\_, 21 ... ?

$$+d \quad +d \quad +d \quad +d$$

$$6+d+d+d=15 \quad 15+d+d=21$$

$$6+3d=15 \quad 15+2d=21$$

$$3d=9$$

$$2d=6$$

$$d=3$$

$$d=3$$

$$a_n = dn + a_0$$

$$6 = 3(5) + a_0$$

$$6 = 15 + a_0$$

$$-9 = a_0$$

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$$a_5 = 6,$$

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$$a_{66} = ?$$

$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{66}$   
\_\_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, 6, \_\_\_\_\_, \_\_\_\_\_, 15, \_\_\_\_\_, 21 ... ?

$$+d \quad +d \quad +d \quad +d$$

$$6+d+d+d=15 \quad 15+d+d=21$$

$$6+3d=15 \quad 15+2d=21$$

$$3d=9$$

$$2d=6$$

$$d=3$$

$$d=3$$

$$d=3$$

$$a_{66} = 189$$

$$a_n = dn + a_0$$

$$6 = 3(5) + a_0$$

$$6 = 15 + a_0$$

$$-9 = a_0$$

**Find the 17th term in the sequence**

$$a_5=4, \quad a_8=32, \quad a_{10}=128, \quad a_{17}=\underline{\hspace{2cm}}$$

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# Find the 17th term in the sequence

$$a_5=4, \quad a_8=32, \quad a_{10}=128, \quad a_{17}=?$$

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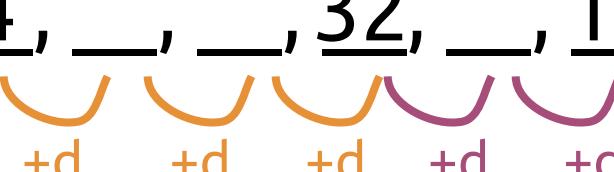
$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{17}$   
\_\_\_\_\_, \_\_\_, \_\_\_, \_\_\_, 4, \_\_\_, \_\_\_, 32, \_\_\_, 128 ... ?

+d      +d      +d      +d      +d

# Find the 17th term in the sequence

$$a_5=4, \quad a_8=32, \quad a_{10}=128, \quad a_{17}=?$$

---

$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{17}$   
\_\_\_\_\_, \_\_\_, \_\_\_, \_\_\_, 4, \_\_\_, \_\_\_, 32, \_\_\_, 128 ... ?  


$$4+d+d+d=32 \quad 32+d+d=128$$

$$4+3d=32 \quad 32+2d=128$$

$$3d=28 \quad 2d=96$$

$$d=9\frac{1}{3} \quad d=48$$

NOT ARITHMETIC

# Find the 17th term in the sequence

$$a_5=4, \quad a_8=32, \quad a_{10}=128, \quad a_{17}=?$$

---

$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{17}$   
\_\_\_\_\_, \_\_\_, \_\_\_, \_\_\_, 4, \_\_\_, \_\_\_, 32, \_\_\_, 128 ... ?



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$$a_5=4, \quad a_8=32, \quad a_{10}=128, \quad a_{17}=?$$

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$a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{17}$   
\_\_\_\_\_, \_\_\_, \_\_\_, \_\_\_, 4, \_\_\_, \_\_\_, 32, \_\_\_, 128 ... ?

$$4 \cdot r \cdot r \cdot r = 32$$

$$4 \cdot r^3 = 32$$

$$r^3 = 8$$

$$r = 2$$

$$32 \cdot r \cdot r = 128$$

$$32 \cdot r^2 = 128$$

$$r^2 = 4$$

$$r = 2$$

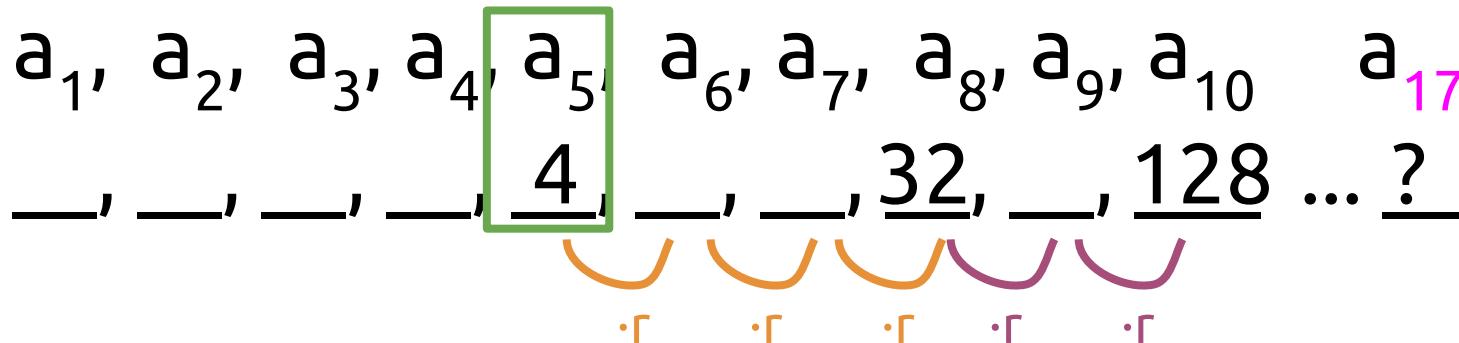
# Find the 17th term in the sequence

$$a_5 = 4,$$

$$a_8 = 32,$$

$$a_{10} = 128,$$

$$a_{17} = ?$$



$$4 \cdot \Gamma \cdot \Gamma \cdot \Gamma = 32$$

$$4 \cdot \Gamma^3 = 32$$

$$\Gamma^3 = 8$$

$$\Gamma = 2$$

$$32 \cdot \Gamma \cdot \Gamma = 128$$

$$32 \cdot \Gamma^2 = 128$$

$$\Gamma^2 = 4$$

$$\Gamma = 2$$

$$\Gamma = 2$$

$$a_n = a_0 \cdot \Gamma^n$$

$$4 = a_0 \cdot 2^5$$

$$4 = a_0 \cdot 32$$

$$0.125 = a_0$$

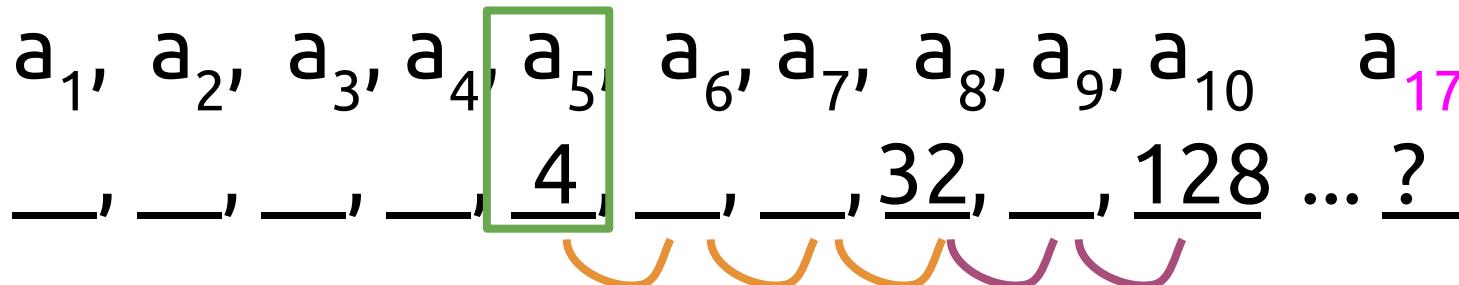
# Find the 17th term in the sequence

$$a_5 = 4,$$

$$a_8 = 32,$$

$$a_{10} = 128,$$

$$a_{17} = ?$$



$$a_n = a_0 \cdot r^n$$

$$a_n = 0.125 \cdot 2^n$$

$$a_{17} = 0.125 \cdot 2^{17}$$

$$a_{17} = 16384$$

$$4 \cdot r \cdot r = 32$$

$$4 \cdot r^3 = 32$$

$$r^3 = 8$$

$$r = 2$$

$$32 \cdot r \cdot r = 128$$

$$32 \cdot r^2 = 128$$

$$r^2 = 4$$

$$r = 2$$

$$a_n = a_0 \cdot r^n$$

$$4 = a_0 \cdot 2^5$$

$$4 = a_0 \cdot 32$$

$$0.125 = a_0$$