

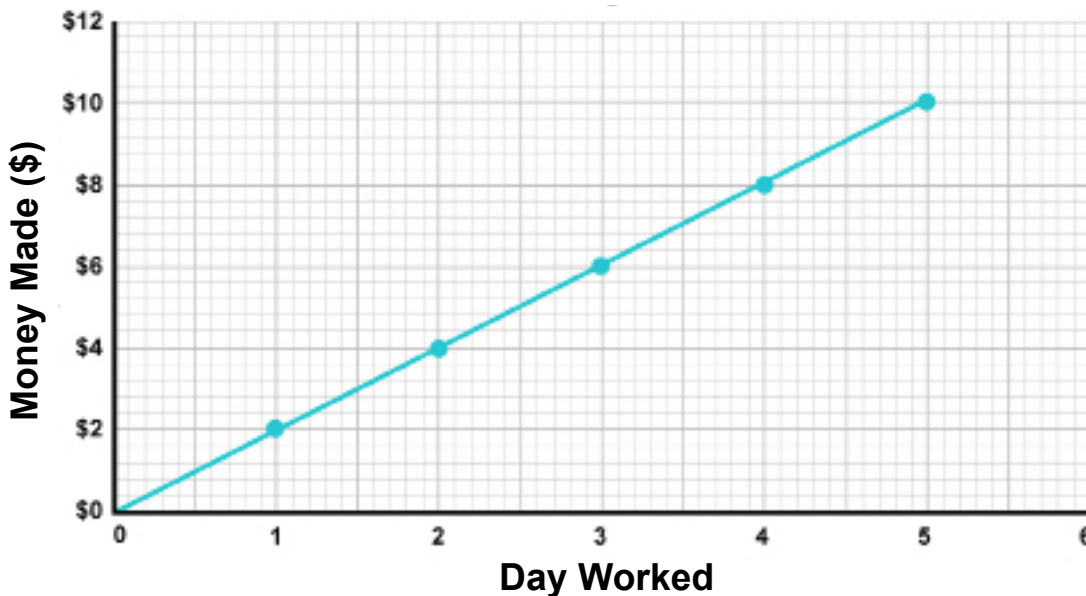
Constructing Linear Functions of Arithmetic Sequences

Name: _____

Directions: Answer the following questions. Make sure to show all your work.

1. The earnings of a worker is shown by the graph below. Using this graph, answer the questions that follow.

Earnings



- a. Write the equation for this graph in the form of $y = mx + b$.

- b. This function represents an arithmetic sequence. What does the slope represent?

c. Show that this graph can also be represented by the arithmetic sequence equation $a_n = a_1 + (n - 1)d$.

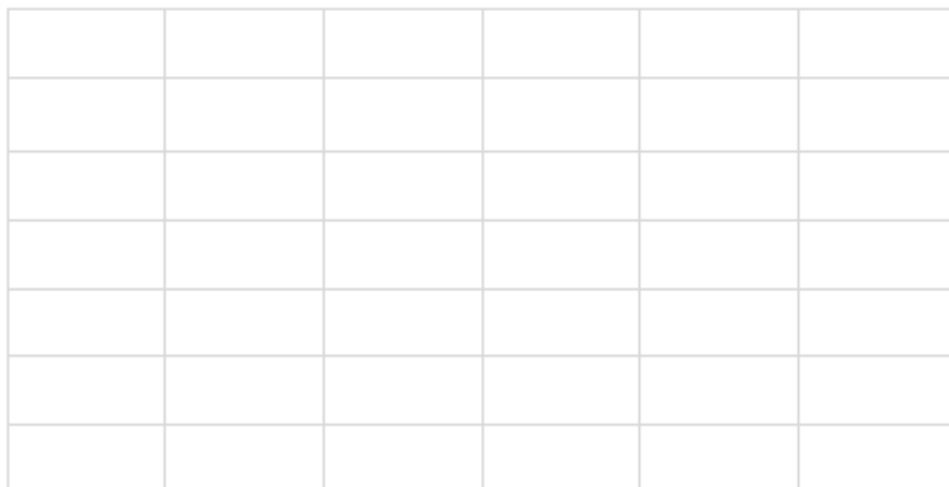
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d. In this case, what is a_{10} ?

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2. Graph the data below and then answer the questions that follow.

Year	Investment
1	\$20,000
2	\$21,750
3	\$23,500
4	\$25,250
5	\$27,000



a. Is this an arithmetic sequence? How do you know?

b. How much does the investment grow each year?

c. How much money did the investment start out as?

d. What sequence equation would represent this graph?

e. What would the value of the investment be after another 10 years?

f. What would the value of the investment be after a total of 20 years?

3. An arithmetic sequence has a 10th term of 15 and 14th term of 35.

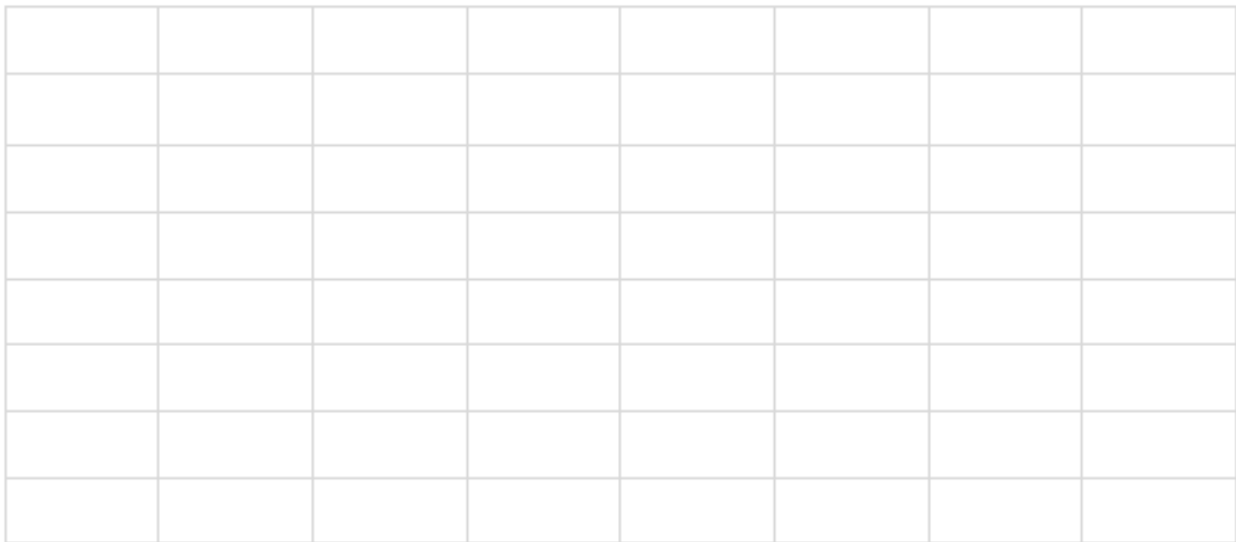
a. What is the common difference?

b. What is the value of the first term?

Use the value of **d** in one of the sequence equations from **a**.

c. What is the general sequence equation for this situation?

d. Create a graph of this situation.



e. Show that the equation ($y = mx + b$) of this graph equals $a_n = -30 + (n - 1)5$.

4. The chart below represents the kinematics of a freely falling body.

Time (seconds t)	Total Distance meters d (t)
1	5
2	20
3	45
4	80
5	125

a. Is the relationship between time and distance an arithmetic sequence? Explain.

b. The total distance a freely falling body covers in time, t , is given by the equation $d(t) = \frac{1}{2}gt^2$, where g is constant at 10 m/s^2 . Show, in terms of n , the distance a falling body covers in $t = n$ seconds of movement.

c. Show, in terms of n , the distance a falling body covers in $t = n - 1$ seconds of movement.

d. The distance a freely falling body covers in the n^{th} second is given by $s_{(n)} = d_{(n)} - d_{(n-1)}$. Show $s_{(n)}$ in terms of g , in simplified form.



e. Prove that the quantities $s_{(n)}$ form an arithmetic sequence.

