

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

$$a_1 = f(1) = 1 \quad d = 4$$

1. Write a formula for the n^{th} term of the arithmetic sequence 1, 5, 9, 13, Then use the formula to find $f(20)$.

$$f(n) = 1 + 4(n-1)$$

OR

$$f(n) = -3 + 4n$$

$$f(20) = 1 + 4(20-1) \\ = 1 + 4(19)$$

$$f(20) = 77$$

2. Find the $f(8)$ of the arithmetic sequence when $f(1) = 4$ and whose common difference is -7 .

$$a_1 = 4 \quad d = -7$$

$$f(n) = 4 - 7(n-1)$$

OR

$$f(n) = 11 - 7n$$

$$f(8) = 4 - 7(8-1) \\ = 4 - 7(7) \\ = 4 - 49$$

$$f(8) = -45$$

3. Daniel gets a job with a starting salary of \$70,000 per year with an annual raise of \$3,000. What will Daniel's salary be in the 10th year? Write an explicit formula and then solve.

$$f(n) = 70,000 + 3000(n-1)$$

OR

$$f(n) = 67000 + 3000n$$

$$f(10) = \$97,000$$



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4. Save-A-Lot Theater ticket prices were originally \$1 each. Prices have risen by 50 cents each year since. What is the price of a ticket 8 years later? Write an explicit formula and then solve.

$$f(1) = 1 \quad d = 0.50$$

$$f(n) = 1 + 0.5(n-1)$$

OR

$$f(n) = 0.5 + 0.5n$$

↳
9th term

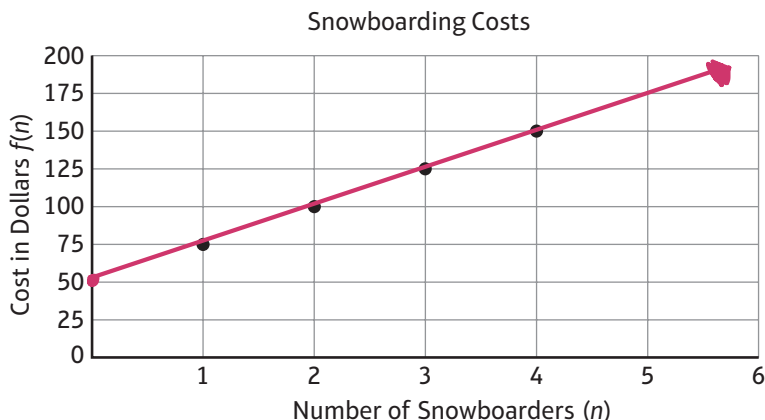
$$f(9) = \$5.00$$



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5. The graph shows how the cost of a snowboarding trip depends on the number of boarders.

A. Fill in the chart of the data.



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n	f(n)
0	50
1	75
2	100
3	125
4	150

B. Write the explicit rule.

$f(1) = 75$ $d = 25$

$f(n) = 75 + 25(n-1)$

OR

$f(n) = 50 + 25n$

C. Draw a line connecting the data points. What is the y-intercept? What is the slope? Write an equation of the line in slope-intercept form.

y-intercept = 50

Slope = 25

$y = 25x + 50$

D. What do you notice about the answers in Parts B and C? Explain (use m and d in your response).

The 2 equations are the same.

Slope (m) = common difference (d)

y-int = term 0

6. Consider the sequence that follows a plus 3 pattern: 4, 7, 10, 13, 16, ...

A. Write a formula for the sequence using the $f(n)$ notation. $f(1) = 4$ $d = 3$

$$f(n) = 4 + 3(n-1)$$

OR

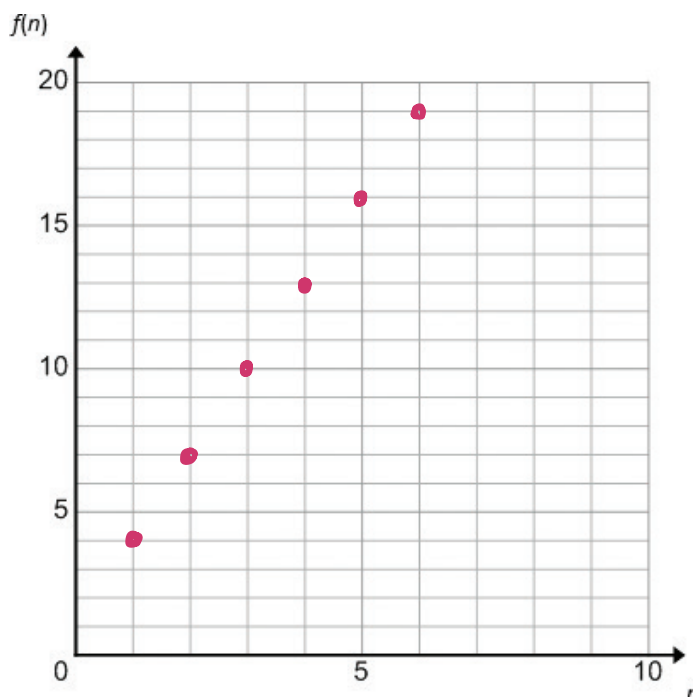
$$f(n) = 3n + 1$$

B. Does the formula $f(n) = 3(n-1) + 4$ generate the same sequence? Why might some people prefer this formula? \curvearrowright They were just switched.

yes, it is similar to $y = mx + b$ form.

C. Graph the terms of the sequence as ordered pairs $(n, f(n))$ on the coordinate plane. What do you notice about the graph?

It is linear.



7. Consider a sequence that follows a minus 5 pattern: 30, 25, 20, 15, ...

- A. Write a formula for the n^{th} term of the sequence. Be sure to specify what value of n your formula starts with.

$$f(1) = 30 \quad d = -5$$

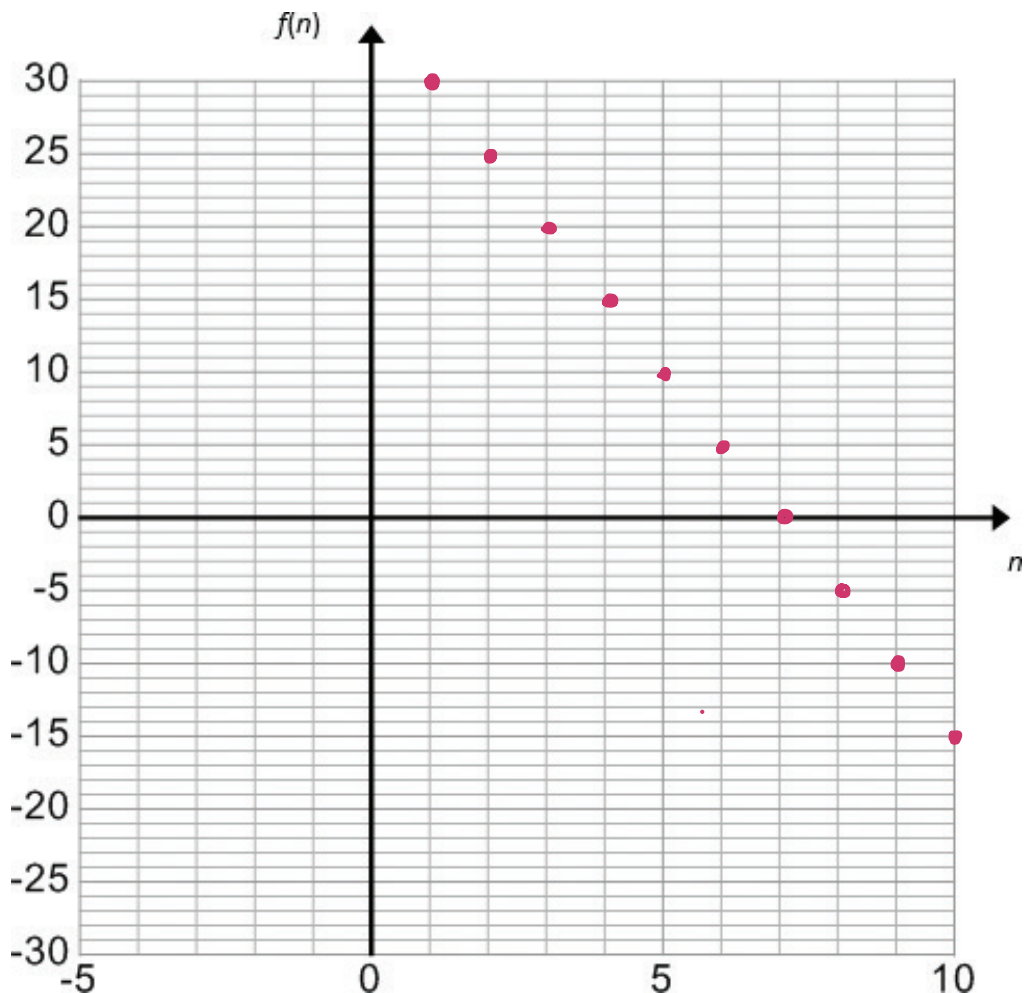
$$f(n) = 30 - 5(n-1)$$

- B. Using the formula, find the 20th term of the sequence.

$$\begin{aligned} f(20) &= 30 - 5(20-1) \\ &= 30 - 5(19) \\ &= 30 - 95 \end{aligned}$$

$$f(20) = -65$$

- C. Graph the terms of the sequence as ordered pairs $(n, f(n))$ on the coordinate plane.



Challenge Problems 8–16

Find an explicit form $f(n)$ for each of the following arithmetic sequences (assume a is some real number and x is some real number).

8. $-34, -22, -10, 2, \dots$

$$\begin{aligned} f(n) &= -34 + 12(n-1) \\ &\text{OR} \\ f(n) &= 12n - 46 \end{aligned}$$

9. $\frac{1}{5}, \frac{1}{10}, 0, -\frac{1}{10}, \dots$

$$\begin{aligned} f(n) &= \frac{1}{5} - \frac{1}{10}(n-1) \\ &\text{OR} \\ f(n) &= \frac{3}{10} - \frac{1}{10}n \end{aligned}$$

10. $x + 4, x + 8, x + 12, x + 16, \dots$

$$\begin{aligned} f(n) &= x + 4 + 4(n-1) \\ &\text{OR} \\ f(n) &= x + 4n \end{aligned}$$

11. $a, 2a + 1, 3a + 2, 4a + 3, \dots$

12. Consider the arithmetic sequence $13, 24, 35, \dots$

A. Find an explicit form for the sequence in terms of n .

$$\begin{aligned} f(n) &= 13 + 11(n-1) \\ f(n) &= 11n + 2 \end{aligned}$$

B. Find the 40th term.

$$\begin{aligned} f(40) &= 11(40) + 2 \\ f(40) &= 442 \end{aligned}$$

C. If the n^{th} term is 299, find the value of n .

$$299 = 11n + 2$$

$$n = 27$$

$$f(27) = 299$$

13. If $-2, a, b, c, 14$ forms an arithmetic sequence, find the values of $a, b,$ and c .

14. $3 + x, 9 + 3x, 13 + 4x, \dots$ is an arithmetic sequence for some real number x .

A. Find the value of x .

B. Find the 10th term of the sequence.

15. Find an explicit form $f(n)$ of the arithmetic sequence where the 2nd term is 25 and the sum of the 3rd term and 4th term is 86.

16. In the right triangle figure below, the lengths of the sides a cm, b cm, and c cm of the right triangle form a finite arithmetic sequence. If the perimeter of the triangle is 18 cm, find the values of $a, b,$ and c .

