

#11 p. 181

Standard Form:

$$Ax + By + Cz = D$$

A, B, C, D are numbers  
 x, y, z variables

First 2 equations  
 are in standard  
 form. Third is  
 not.

$$x - y + 2z = -7$$

$$0x + y + z = 1$$

$$x = 2y + 3z$$

$$x - 2y = 3z$$

$$x - 2y - 3z = 0$$

↑  
 Standard Form

$$A = 1$$

$$B = -2$$

$$C = -3$$

$$D = 0$$

#15

$$1x + 2y + 3z = 6$$

$$0x + 1y + 2z = 0$$

$$0x + 0y + 1z = 2$$

$$\leftarrow \text{rref} \begin{bmatrix} 1 & 2 & 3 & 6 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 1 & 2 \end{bmatrix}$$

p. 182 # 17

$$\begin{cases} x + 3y - z = -4 \\ 2x - y + 2z = 13 \\ 3x - 2y - z = -9 \end{cases}$$

rref

$$\left[ \begin{array}{cccc} 1 & 3 & -1 & -4 \\ 2 & -1 & 2 & 13 \\ 3 & -2 & -1 & -9 \end{array} \right]$$

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- 1 A sequence begins with the terms  $a_1 = 5$  and  $a_2 = 10$ . What would  $a_3$  be if the the sequence is arithmetic? if it is geometric?

$$a_1 = 5$$

$$a_2 = 10$$

$$a_3 = ?$$

arithmetic 15  
( $d=5$ )

geometric 20  
( $r=2$ )

2 Consider the sequence: 1, 5, 2, 6, 3, 7, ...

Which of the following describe the sequence?

neither geom. nor  
arithm.

3 The first term of a geometric sequence is 3. The fifth term of the same sequence is 768. Which of the following could be the terms of the sequence between the first and the fifth?

$$a_1 = 3 \quad a_5 = 768$$

$$3, \boxed{\pm 12}, \boxed{\pm 48}, \boxed{\phantom{000}}, 768$$

$a_1 \quad a_2 \quad a_3 \quad a_4 \quad a_5$

\* Formula: geometric mean of  
 $x$  &  $y = \pm \sqrt{x \cdot y}$

$$a_3 = \pm \sqrt{3 \cdot 768} = \pm 48$$

$$a_2 = \pm \sqrt{3 \cdot 48} = \pm 12$$

- 4 Profits,  $P$ , are equal to sales,  $S$ , minus expenses,  $E$ . If expenses are equal to travel,  $T$ , plus materials,  $M$ , which system of equations models this situation?

$$P = S - E$$
$$E = T + M$$

- 5 A sequence is defined using the recursive formula:

$$a_1 = 20$$

$$a_n = a_{n-1} + 6 \text{ where } n \geq 2 \text{ arithmetic}$$

Which of the following sequences would be generated by the recursive formula above?

$$20, 26, 32, \dots$$

$$6 \quad \begin{cases} 3x - y + 5 = 0 \\ 2x + 3y - 4 = 0 \end{cases}$$

$$\text{Standard: } Ax + By = C$$

What is the solution to this system of equations?

$$\text{Elimination: } \begin{array}{r} 9x - 3y + 15 = 0 \\ 2x + 3y - 4 = 0 \\ \hline 11x + 11 = 0 \end{array}$$

$$3x - y + 5 = 0$$

$$3(-1) - y + 5 = 0$$

$$-3 - y + 5 = 0$$

$$-y + 2 = 0$$

$$y = 2$$

$$11x + 11 = 0$$

$$11x = -11$$

$$x = -1$$

$$(-1, 2)$$

$$6 \quad \begin{cases} 3x - y + 5 = 0 \\ 2x + 3y - 4 = 0 \end{cases}$$

$$\text{Standard: } Ax + By = C$$

What is the solution to this system of equations?

$$\text{MATRIX: } 3x - y = -5$$

$$2x + 3y = 4$$

$$\dots \xleftarrow{\text{rref}} \begin{bmatrix} 3 & -1 & -5 \\ 2 & 3 & 4 \end{bmatrix}$$

# Topic: convergence and divergence of sequence

convergence: terms get closer and closer to a single output value as  $n$  increases

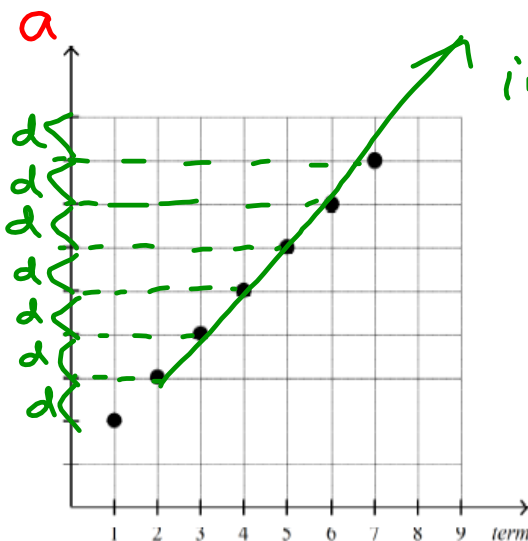
divergence: not convergent terms either increase or decrease without limit

For each of the graphs below, say which of the descriptions A, B, C, or D applies.

- A) converging geometric sequence  
B) converging arithmetic sequence

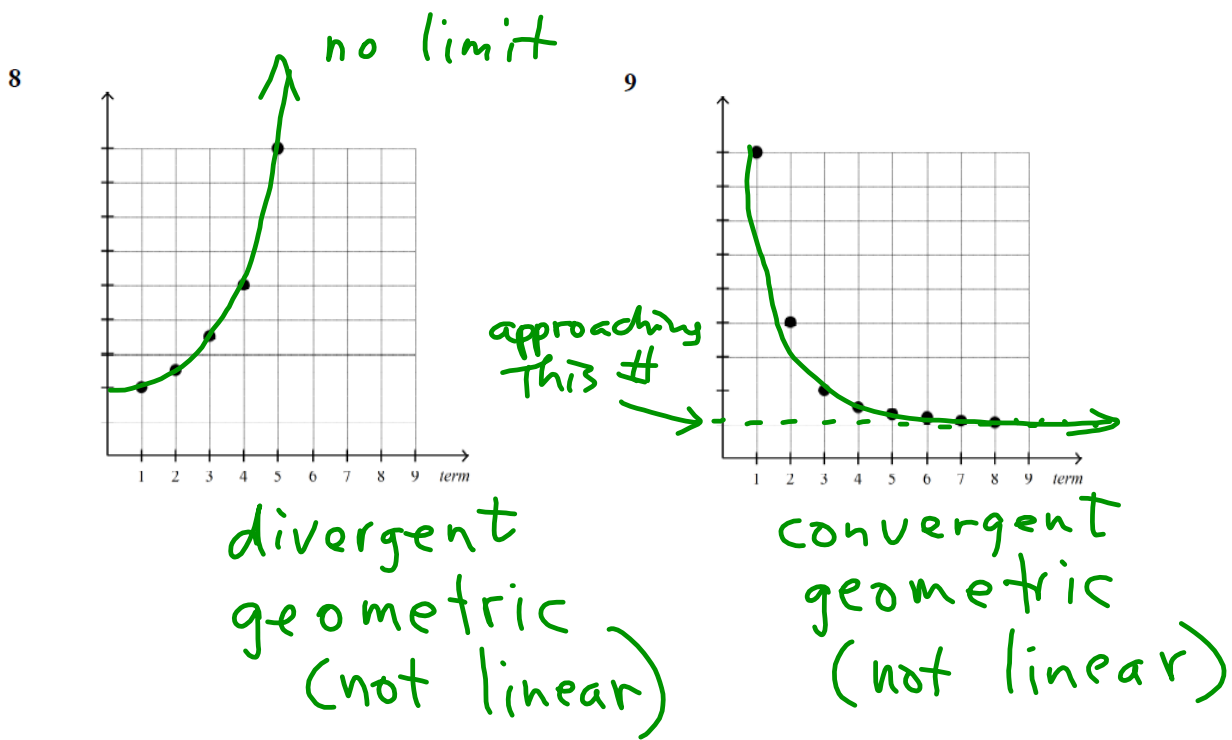
- C) diverging geometric sequence  
D) diverging arithmetic sequence

7



increase without limit  
→ not convergent  
→ divergent

arithmetic sequences graph on a straight line



- 10 Madison had \$20,000 in student loan debt when she graduated from college. The balance increases by 2% each month due to interest. Madison could only make a payment of \$600 per month. Using the formula  $b_n = 1.02(b_{n-1}) - 600$  show her balance for the first 5 months after graduation.

11 Terry currently earns \$28,000 per year. Each year Terry receives a \$4,000 increase in salary.

A) Write a recursive formula to model this pattern.

B) Write an explicit formula to model this pattern

C) What will Terry's salary be in 12 years?