

H/W:  $(-3, -8)$ ,  $(4, -64)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-64 - (-8)}{4 - (-3)} = \frac{-56}{7} = -8$$

$$m = \underline{\underline{-8}}$$

$$y = mx + b$$

$$-8 = -8(-3) + b$$

$$-8 = 24 + b$$

$$-32 = b$$

$$y = -8x - 32$$

Arithmetic Sequence: A sequence where you add or subtract the same amount between terms.

$$y = mx + b \iff a_n = m \cdot n + b$$

[EX 1]

Find a general rule ( $a_n = ?$ ) for the arithmetic sequence:

5, 6, 7, 8, 9, 10, ...

(1, 5)

 $m = 1$ 

$$a_n = 1 \cdot n + b$$

$$y = mx + b$$

$$5 = 1(1) + b$$

$$4 = b$$

$$y = x + 4$$

$$a_n = n + 4$$

[EX 2]

Find a general rule ( $a_n = ?$ ) for the arithmetic sequence:

-5, -1, 3, 7, 11, 15, ...

 $m = 4$ 

$$y = mx + b$$

$$7 = 4(4) + b$$

$$7 = 16 + b$$

$$\begin{array}{r} -16 \\ -9 = b \end{array}$$

$$y = 4x - 9$$

$$a_n = 4n - 9$$

x	y
4	7

**[EX 3]**

Find a general rule ( $a_n = ?$ )  
for the arithmetic sequence:  
18, 16, 14, 12, 10, 8, ...

$$m = -2$$

$$(6, 8)$$

$$y = mx + b$$

$$8 = -2(6) + b$$

$$8 = -12 + b$$

$$20 = b$$

$$y = -2x + 20$$

$$a_n = -2n + 20$$

**[EX 4]**

Find a general rule ( $a_n = ?$ )  
for the arithmetic sequence:  
2, 5, 8, 11, 14, 17, ...

$$m = 3 \quad (5, 14)$$

$$y = mx + b$$

$$14 = 3(5) + b$$

$$14 = 15 + b$$

$$-1 = b$$

$$y = 3x - 1$$

$$a_n = 3n - 1$$

**[EX 5]**

An arithmetic sequence has the properties that  $a_5 = 20$  and  $a_{11} = 68$ . Find its general rule ( $a_n = ?$ ) and use this rule to find  $a_{100}$ .

$$m = \frac{68 - 20}{11 - 5} = \frac{48}{6} = 8$$

$$\begin{aligned} y &= mx + b \\ 20 &= 8(5) + b \\ 20 &= 40 + b \\ -20 &= b \\ y &= 8x - 20 \end{aligned}$$

$$(5, 20)$$

$$(11, 68)$$

$$m = 8$$

$$a_n = 8n - 20$$

$$\begin{aligned} a_{100} &= 8(100) - 20 \\ &= 800 - 20 \end{aligned}$$

$$a_{100} = 780$$

**[EX 6]**

An arithmetic sequence has the properties that  $a_{17} = -8$  and  $a_{24} = -36$ . Find its general rule ( $a_n = ?$ ) and use this rule to find  $a_{100}$ .

$$(17, -8)$$

$$(24, -36)$$

$$m = \frac{-36 - (-8)}{24 - 17} = \frac{-28}{7} = -4$$

$$m = -4$$

$$\begin{aligned} y &= mx + b \\ -8 &= -4(17) + b \\ -8 &= -68 + b \\ 60 &= b \end{aligned}$$

$$a_n = -4n + 60$$

$$\begin{aligned} a_{100} &= -4(100) + 60 \\ &= -400 + 60 \\ &= -340 \end{aligned}$$