

Match each of the following simplified expressions on the left with its matching factored expression on the right.

b 1. $x^2 - 3x - 18$

~~a.~~ $(4x-1)-(6x+3)$

d 2. $3x^2 - 12$

~~b.~~ $(x+3)(x-6)$

a 3. $-2x - 4$

~~c.~~ $(5x+1)(x+4)$

e 4. $10x + 2$

~~d.~~ $3(x-2)(x+2)$

c 5. $5x^2 + 21x + 4$

~~e.~~ $(4x-1)+(6x+3)$

6. Given $f(x) = 5x^2 + 21x + 4$, find the following:

a. $f(4) = 5(4)^2 + 21(4) + 4$
 $= 5(16) + 84 + 4$
 $= 164$

b. $f(0) = 4$

7. Given the sequence, write a recursive and explicit equation.

a. 1, 3, 5, 7, 9, ... $a_1 = 1$ $a_n = a_{n-1} + 2$

$$f(n) = 2(n-1) + 1$$

b. 2, 4, 8, 16, 32, ...

$$a_1 = 2 \quad a_n = a_{n-1} \cdot 2$$

$$f(n) = 2 \cdot 2^{(n-1)}$$

8. Analyze the tables.

a. Classify the pattern as linear, quadratic or exponential.

b. Write an equation for each table.

Quadratic

f(x)	x
-1	2
0	3
1	6
2	11
3	18

> +1
> +3 > +2
> +5 > +2
> +7 > +2

$a = \frac{2}{2} = 1$
 $c = 3$
 $y = x^2 + bx + 3$
 $0 = (1)^2 + b(1) + 3$
 $0 = 1 + b + 3$
 $6 = b + 4$
 $-4 \quad -4$
 $2 = b$

$y = x^2 + 2x + 3$ // Explicit

Linear

f(x)	x
-1	-3
0	2
1	7
2	12
3	17

> +5
> +5
> +5
> +5

$a_1 = 7 \quad a_n = a_{n-1} + 5$ // Recursive

$f(n) = 5(n-1) + 7$ // Explicit

$y = 5x + 2$ // slope - intercept

Exponential

f(x)	x
-1	1/5
0	1
1	5
2	25
3	125

> +4/5
> +4 > +3/5
> +20 > +16
> +100 > +80

$a_1 = 5 \quad a_n = a_{n-1} \cdot 5$ // Recursive

$f(n) = 5 \cdot 5^{(n-1)}$ // Explicit

$y = 1 \cdot 5^x$ // Exponential

9. a. Write the first five terms of the sequence.

$$\begin{cases} a_1 = 4 \\ a_n = a_{n-1} + 9 \end{cases}$$

b. Write the explicit form of the equation

$$f(n) = 9(n-1) + 4$$

c. Find $f(x) = 58$

$$58 = 9(n-1) + 4$$

$$-4 \quad -4$$

$$54 = 9(n-1)$$

$$\frac{54}{9} = \frac{9(n-1)}{9}$$

$$6 = n-1$$

$$+1 \quad +1$$

$$5 = n$$

10.



fig 1

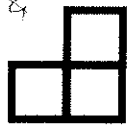


fig 2

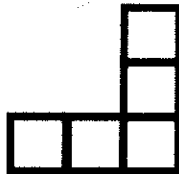


fig 3

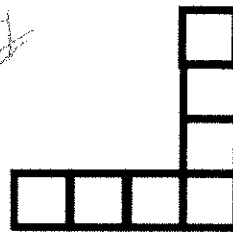


fig 4

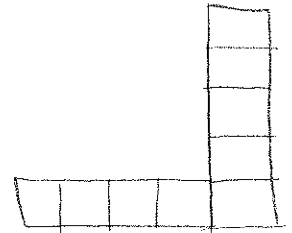


Fig 5

a. Draw figure 5 next to figure 4.

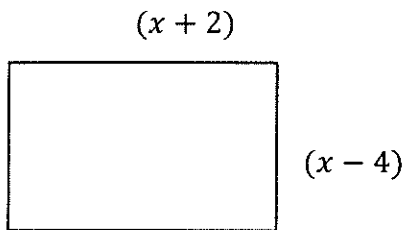
b. Model this function in another way.

$$a_1 = 1 \quad a_n = a_{n-1} + 2$$

$$f(n) = 2(n-1) + 1$$

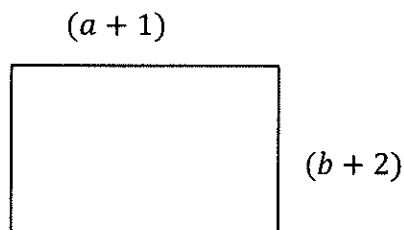
1	1
2	3
3	5
4	7
5	9

11. Give the area and perimeter of the box provided.



Perimeter $4x - 4$

Area $x^2 - 2x - 8$



Perimeter $2a + 2b + 6$

Area $ab + 2a + b + 2$

12. The area of a pig pen is given by the equation $f(x) = -x^2 + 8x$, where x represents the length.

a. What does $f(2)$ mean in this context?

Looking for the area when the length is 2.

Find $f(2)$

$$\begin{aligned} f(2) &= -(2)^2 + 8(2) \\ &= -(4) + 16 \\ &= 12 \end{aligned}$$

b. What is $f(9)$?

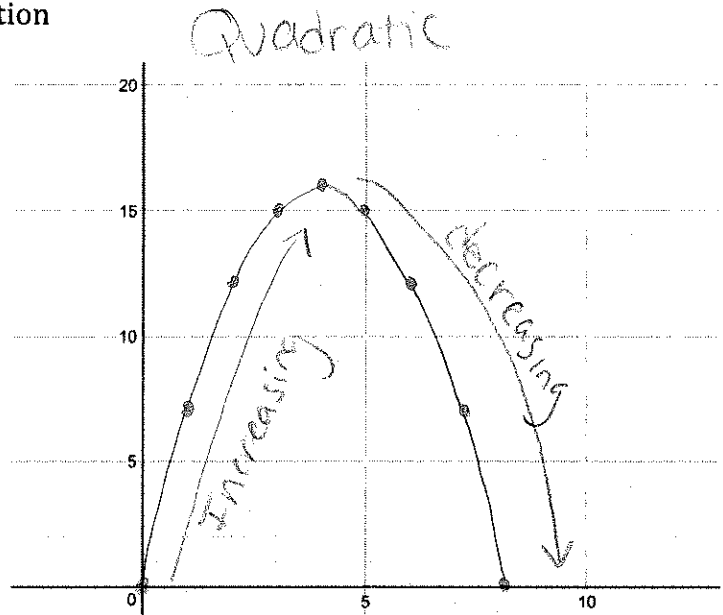
$$\begin{aligned} f(9) &= -(9)^2 + 8(9) \\ &= -(81) + 72 \rightarrow = -9 \end{aligned}$$

Does $f(9)$ make sense in the context of this equation?

NO, because you cannot have a negative area.

c. Make a table and graph of this situation

Length	Area
0	0
1	7
2	12
3	15
4	16
5	15
6	12
7	7
8	0



d. On your graph find the maximum value. Indicate where the graph is increasing and decreasing.