

LESSON 1.2 Skills Practice

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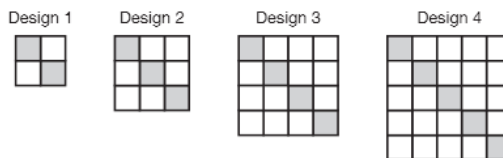
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Are They Saying the Same Thing?
Using Patterns to Generate Algebraic Expressions

Problem Set

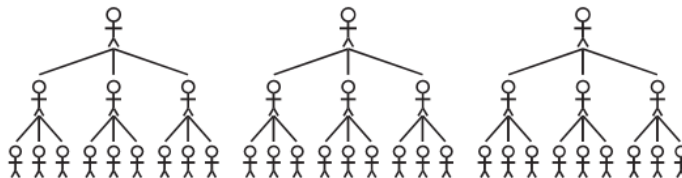
Write an expression to represent each pattern.

1. Renetta is creating a design for a craft project. Write an expression to represent the number of shaded squares in each piece of the design.



The number of shaded squares in each design is one more than the design number. So, the expression is $n + 1$.

2. Three candidates for the student government each tell three other people that the election will be held next Tuesday. Those three people each tell three more people. Write an expression to model the number of people who hear the about the election being held next Tuesday.



3. Charlie watches as a pattern develops. He starts with 3 guppy fish in his fish tank. The next month, he finds 6 guppy fish in his tank. The following month, he finds 11 guppy fish in his fish tank. Write an expression to model the pattern of guppy fish in Charlie's fish tank. Show your work.

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4. After 1 minute, a file Portia is downloading from the internet is at 0 kilobytes downloaded. After 2 minutes, the file is at 7 kilobytes downloaded. After 3 minutes, the file is at 26 kilobytes downloaded. After 4 minutes, the file is at 63 kilobytes downloaded. Write an expression to model the amount of the file downloaded. Explain your reasoning.
5. A library receives book donations over the course of the year. The number of books received each month is listed in the table. Write an expression to model the number of books received by the library. Explain your reasoning.

| Time (months) | Number of Books Received |
|---------------|--------------------------|
| 1 | 2 |
| 2 | 11 |
| 3 | 26 |
| 4 | 47 |
| 5 | 74 |

6. A website begins its first week with 3 subscribers. The number of subscribers each week is listed in the table. Write an expression to model the number of subscribers at the website each week.

| Time (weeks) | Number of Subscribers |
|--------------|-----------------------|
| 1 | 3 |
| 2 | 17 |
| 3 | 55 |
| 4 | 129 |
| 5 | 251 |

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Determine whether the two expressions are equivalent. Explain your reasoning.

7. $6n + 8$ and $2(3n + 4)$

The expressions are equivalent.**Use the distributive property and combine like terms.**

$2(3n + 4) = 6n + 8.$

8. $(n^2 + 4n) - n^2$ and $4n$

9. $3x + 5$ and $2(x + 3)$

10. $15 - 6x$ and $15(1 - 6x)$

11. $(y + y + 2 + y) + 3y$ and $6y + 2$

12. $8y - 3 + 10y$ and $3(6y - 1)$

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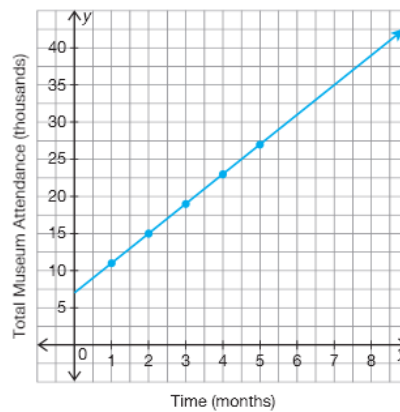
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Represent each pattern as an expression and as a graph. Then identify whether the pattern is linear, exponential, or quadratic. Explain your reasoning.

13. The table lists the number of people who attended a museum (in thousands) over the course of several months.

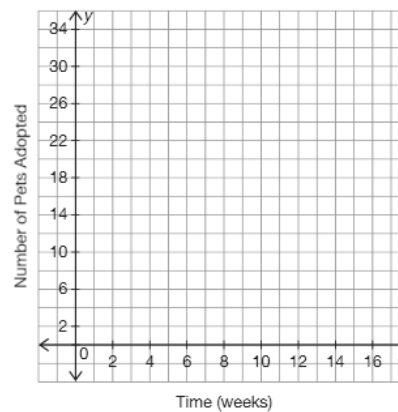
| Time (months) | Total Museum Attendance (thousands) |
|---------------|-------------------------------------|
| 1 | 11 |
| 2 | 15 |
| 3 | 19 |
| 4 | 23 |
| 5 | 27 |



The number of people who attended the museum is four times the number of months plus 7. So, an expression to represent the pattern is $4x + 7$. The pattern is linear.

14. A local pet shelter is able to see many of their pets adopted. The table lists the number of pets that have been adopted over several weeks.

| Time (weeks) | Number of Pets Adopted |
|--------------|------------------------|
| 1 | 8 |
| 2 | 11 |
| 3 | 16 |
| 4 | 23 |
| 5 | 32 |



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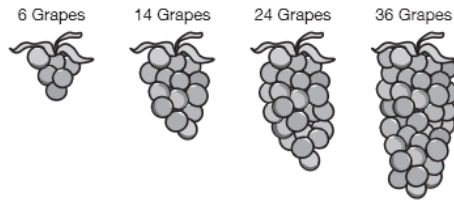
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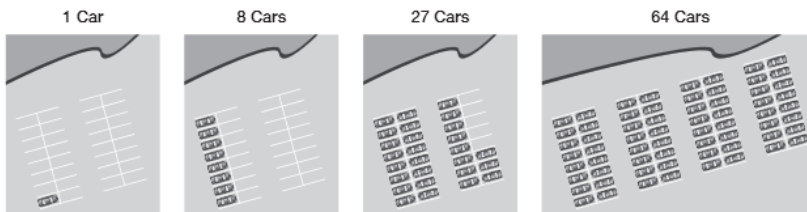
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15. Emilio is looking at bunches of grapes at the market. He starts to notice a pattern in the number of grapes in each bunch. Write an expression for the number of grapes in each bunch.



16. Nolan takes a photo of a parking lot every two hours. He counts the number of cars in each photo. The number of cars increases in each photo. Write an expression for the number of cars in the parking lot.



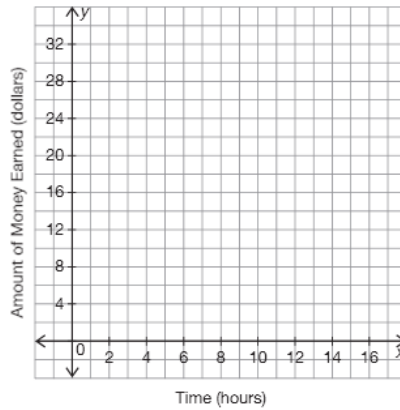
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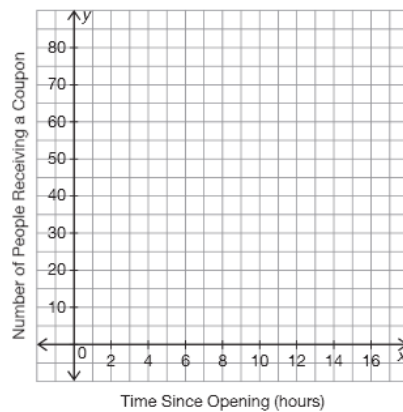
17. The school swim team holds a car wash to earn money for an upcoming trip. The table lists the number of hours that the car wash runs and the amount of money earned during the car wash.

| Time (hours) | Amount of Money Earned (in dollars) |
|--------------|-------------------------------------|
| 1 | 20 |
| 2 | 22 |
| 3 | 24 |
| 4 | 26 |
| 5 | 28 |



18. A store had a grand opening sale. During the sale, each person entering the store received a coupon for 10% off their entire purchase. The table lists the number of people who received a coupon.

| Time Since Opening (hours) | Number of People Receiving a Coupon |
|----------------------------|-------------------------------------|
| 1 | 3 |
| 2 | 12 |
| 3 | 27 |
| 4 | 48 |
| 5 | 75 |



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