**12.1**

Tell whether each is true or false. If true, tell which property is demonstrated.

$(3y+24)+15=3y+(24+15)$

$16w-16z=16(w-z)$

$14n+22p\times 0=0$

$(14n+22p)\times\dfrac{1}{14n+22p}=1$

**12.2**

Show the work for each of the following. Tell how the problems in each pair are alike.

I) $\dfrac{7}{23}+\dfrac{11}{23}$ $\qquad\qquad$ $\dfrac{2a}{b+5}+\dfrac{a-2}{b+5}$

II) $\dfrac{3}{8}+\dfrac{3}{4}$ $\qquad\qquad$ $\dfrac{4x}{(x-1)(x+5)}+\dfrac{6}{x+5}$

**12.3**

For the given pattern, determine the $40^{th}$ entry.

1.2, 1.6, 2, 2.4, 2.8, 3.2, . . .

In an arithmetic sequence, each entry after the first is obtained by adding a fixed number to the previous entry. Fill in the blanks for this arithmetic sequence:

2.4, 3.1, 3.8, 4.5, _____, _____, _____; the $20^{th}$ entry is: _____

Complete this sentence: In a geometric sequence, each entry after the first is obtained by

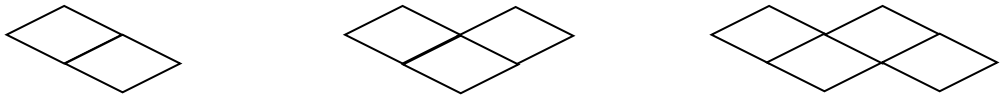
_____

Make up a geometric sequence that begins with the number 3 and list the next 5 entries:

3, _____ , _____ , _____ , _____ , _____

**12.4**

Find a function rule for the number of toothpicks to make Shape *n* in the following pattern:



Shape 1 Shape 2 Shape 3

*A.* $3+4n$

*B.* $4+4n$

*C.* $4+3n$

*D.* $3+3n$

*E.* None of the above

Find a function rule to determine the number of toothpicks to make Shape *n* in the pattern:

1 2 3

function pattern: _____

**12.5**

*In Jacob's CD collection, he has 6 more than twice the number in Frank's collection. Bob has five less than four times Frank's number. Together, Jacob and Frank have as many as Bob.*

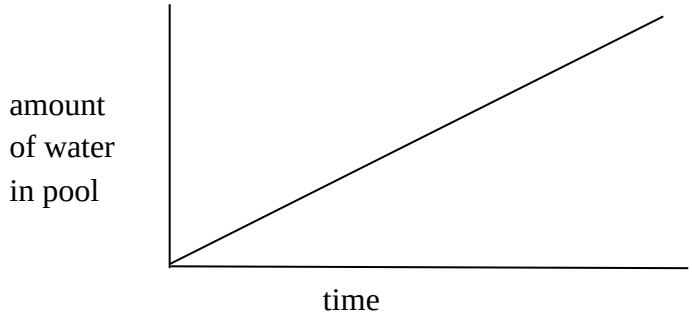
Make and label a strip diagram to illustrate this situation.

Write an algebra equation to represent this situation.
Solve to tell how many CDs each person has.

**13.1**

The graph shown represents the amount of water in a child's pool as time goes by if a small hose is turned on to maximum capacity.
Write a sentence describing how the two quantities are related.

On the same grid, draw a graph to show a new situation with the same pool, but a larger hose turned on to maximum capacity.



**13.2**

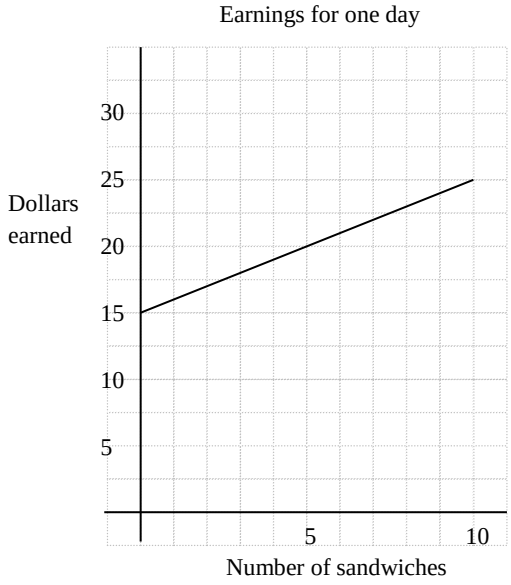
The graph shown represents the following situation: *Ashley delivers sandwiches for Jimmy John's. She is paid $15 for a day's work and $1 for every sandwich she delivers.*

Calculate the slope.

What does the slope mean in this situation?

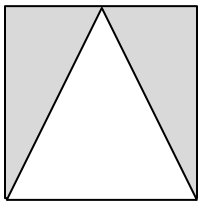
Should this graph be a smooth line or a series of dots? Explain.

If a new line on the same grid had the same slope but a different *y*-intercept, what would that mean?




**13.4**

Describe how the area of the shaded region below is related to the length of the side of the square.



Write an algebraic equation.

Does this describe a linear or nonlinear function? Explain.

**Lesson 8**

Find an equation of the parabola with *x*-intercepts at (2,0) and (8,0) that goes through the point (3,5).

Write your equation in both forms: $y = a(x - x_1)(x - x_2)$ $y = ax^2 + bx + c$

Find the vertex of this parabola.

**Lesson 9**

Make an *x/y* table using the *x*-values: $-4, -3, -2, -1, 0, 1, 2, 3, 4$ for the following equations. Then draw the graph.

$y = 3^x$ $y = \left(\frac{1}{4}\right)^x$

If *P* dollars are deposited in an account earning interest at an annual rate *r*, compounded *k* times each year, the amount *A* in the account after *t* years is given by:

Formula: $A = P\left(1 + \frac{r}{k}\right)^{kt}$

Set up the equation needed to find the amount of money in the bank given these conditions:

$8500 at 2% for *w* years compounded semi-annually

$3000 at 1.5% for 5 years compounded monthly

**Lesson 10**

Show the algebra steps to find the inverse function for $y = 5 - 2x$.

Graph the original and the inverse function on the same set of axes.

Find: $\log_{10} 0.1$ $\log_6 \frac{1}{36}$ $\log_a a^3$