

## Enrichment 3-4

### Fractals and Chaos

This mathematician is best known for developing what is known as fractal geometry. Fractals help describe patterns found in chaotic applications such as stock market fluctuations, weather patterns, and coastline structures.

To reveal this mathematician's name, solve the inequalities. Locate the solution to each inequality in the Answer Code and write the corresponding letter on the blank. Letters may be used more than once.

1.  $2x + 5 \geq -1$

2.  $3(x - 7) \leq -21$

3.  $-4x + 21 > -3$

4.  $2(x - 1) > -3$

5.  $2.4 \geq 1.2x - 3$

6.  $\frac{11}{2} \geq 3x - 2$

7.  $x - \frac{15}{2} \geq -2x$

8.  $6x + 3 < 7 - 2x$

9.  $5x - 2 < 4(x + 1)$

10.  $3(3x - 1) + 5x > 5(5 + x) - 1$

11.  $-2(x - 2) \geq 4$

12.  $2(x + 4) \leq -3(x + 7) - 1$

13.  $-x \leq 9 + 2x$

14.  $-19.5 \geq -3(x + 2)$

15.  $-2(x + 3) < -5$

16.  $-4\left(x - \frac{5}{2}\right) + 2 \geq 2$

#### Answer Code

A  $x < \frac{1}{2}$

B  $x \geq -3$

D  $x > 3$

E  $x \leq 0$

I  $x \leq 4.5$

L  $x \leq -6$

M  $x \geq 2\frac{1}{2}$

N  $x < 6$

O  $x > -\frac{1}{2}$

R  $x \geq 4.5$

T  $x \leq 2\frac{1}{2}$

1    2    3    4    5    6    7    8    9    10    11    12    13    14    15    16

# Enrichment 3-5

## Conjunctions and Venn Diagrams

You have learned that a compound sentence is formed by using the word *and* to join two sentences. A compound sentence is true only if both of the joined sentences are true. You can draw Venn diagrams to illustrate compound sentences.

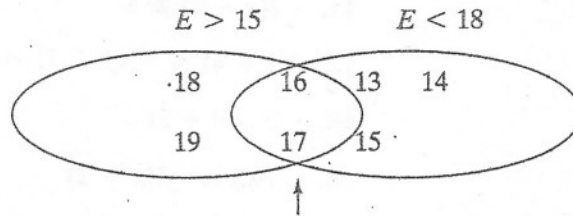
Don, Frank, and Eduardo are teenagers. Eduardo is older than Don and younger than Frank. Don is 15 and Frank is 18.

Eduardo is older than Don, so  $E > D$ .  
Don is 15, so  $E > 15$ .

Eduardo is younger than Frank, so  $E < F$ .  
Frank is 18, so  $E < 18$ .

So Eduardo is a teenager who is older than 15.

So Eduardo is a teenager who is younger than 18.

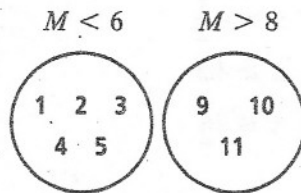


The compound inequality  $15 < E < 18$  describes the situation in which Eduardo is a teenager who is older than 15 *and* younger than 18.

Each student in a week-long reading program read as many as 11 books during the week. Every student reads at least one book. Mary read fewer books than Augustus and more books than Tamara. Augustus read 6 books and Tamara read 8 books.

Mary read fewer books than Augustus, so  $M < A$ . Augustus read 6 books, so  $M < 6$ .

Mary read more books than Tamara, so  $M > T$ . Tamara read 8 books, so  $M > 8$ .



The ovals do not overlap because no values make both sentences true. No compound inequality can be written to describe this situation.

Draw a Venn diagram for each situation. Then, if possible, write a compound inequality to describe the situation.

- The swim club members all swam between 14 and 26 laps. Rhoda swam more laps than Pam and fewer laps than Li. Pam swam 16 laps and Li swam 21 laps.
- Larry sold fewer VCRs than Marty and more VCRs than Kay. Kay sold 9 VCRs and Marty sold 7. No more than 12 VCRs were sold by any salesperson.
- Carlos works more hours per week than Fred and fewer hours per week than Joe. Joe works 12 hours per week and Fred works 14 hours per week. Each of these part-time employees works no more than 20 hours per week.
- Barbara made more bracelets than Ann and fewer bracelets than Carmen. Ann made 25 bracelets and Carmen made 32. Each made at least 24 bracelets, but no one made more than 35 bracelets.

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