

1. Find the length of a segment with endpoints A(1, -3) and B(-2, -7).

$$\begin{aligned} & \sqrt{(1+2)^2 + (-3+7)^2} \\ & \sqrt{3^2 + 4^2} \\ & \sqrt{9+16} \\ & \sqrt{25} = 5 \end{aligned}$$

2. If M(4, -3) is the midpoint of \overline{RS} , and the coordinates of R are (8, -2), find the coordinates of S.

$$\begin{aligned} (4, -3) &= \left(\frac{x+8}{2}, \frac{y+(-2)}{2} \right) \\ 2 \cdot 4 &= \frac{x+8}{2} \quad -3 = \frac{y+(-2)}{2} \\ 8 &= x+8 \quad -6 = y-2 \\ x &= 0 \quad y = -4 \\ & (0, -4) \end{aligned}$$

3. $\angle A$ and $\angle B$ are supplementary. If the measure of $\angle A$ is three times the measure of $\angle B$, find the measure of $\angle B$.

$$x + 3x = 180 \quad x = 45^\circ$$

Patterns and Inductive Reasoning:

Ex 1 Describe how to sketch the fourth figure in the pattern. Then sketch the fourth figure.

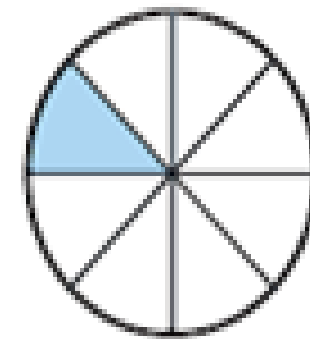
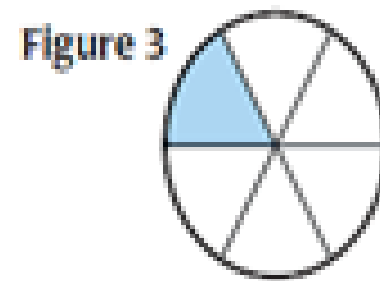
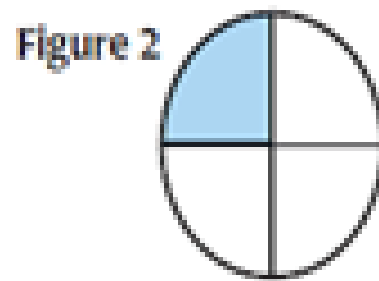
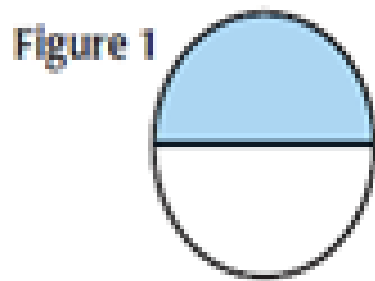
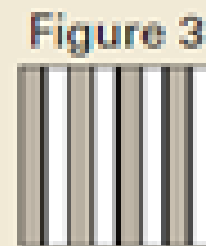
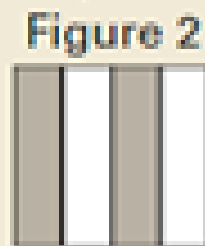
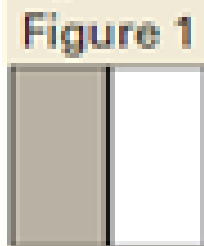


Figure 4

Ex 2 Describe how to sketch the fourth figure in the pattern.



The fourth figure would have 16 sections with every other one shaded

Describe a number pattern:

Ex 1: Describe the pattern in the numbers
-7, -21, -63, -189, ... and write the
next three numbers in the pattern.

multiplying by 3.
-567, -1701, -5103.

Ex 2: Describe the pattern in the numbers
1000, 500, 250, 125, ... and write the
next three numbers in the pattern.

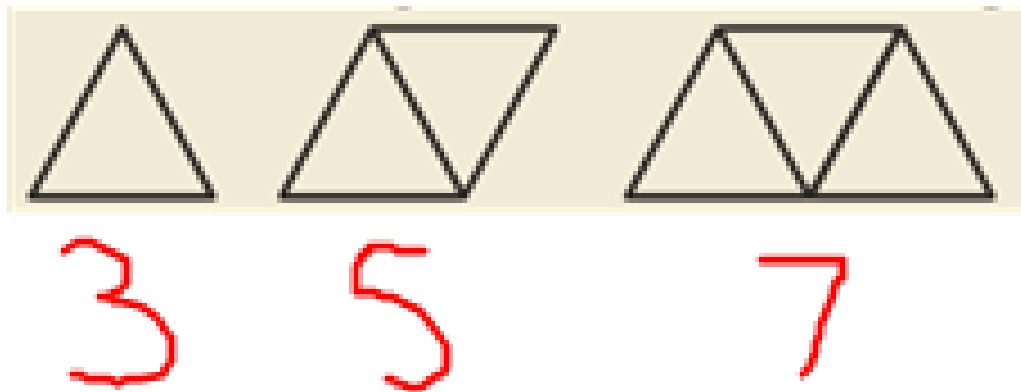
dividing by 2
62.5, 31.25, 15.625.

More Examples

conjecture - an unproven statement based on observations

inductive reasoning - looking for patterns and writing a conjecture

Ex: Given the pattern of triangles below, make a conjecture about the number of segments in a similar diagram with 5 triangles.



add 2 every time, so there would be 11
or use $2x+1$, where x is the # of triangles

Make and test a conjecture:

1. Numbers such as 3, 4, and 5 are called consecutive integers. Make and test a conjecture about the sum of any three consecutive integers.

$$3 + 4 + 5 = 12 \qquad 13 + 14 + 15 = 42$$

$$7 + 8 + 9 = 24 \qquad 1 + 2 + 3 = 6$$

$$10 + 11 + 12 = 33 \qquad 2 + 3 + 4 = 9$$

middle # x 3 $-1 + 0 + 1 = 0 \checkmark$

2. Make and test a conjecture about the sign of the product of any three negative integers.

The product of any 3 neg. ints. will be negative.

counterexample - an example that shows a conjecture is false

- a. A student makes the following conjecture about the sum of two numbers. Find a counterexample to disprove the student's conjecture.

Conjecture The sum of two numbers is always greater than the larger number.

$$2 + -2 = 0 \quad - \quad 3 + -6 = -9$$

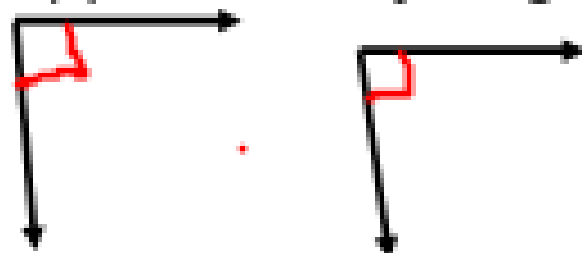
- b. Find a counterexample to show that the following conjecture is false.

"The value of x^2 is always greater than the value of x ."

$$1^2 = 1 \quad 0^2 = 0 \quad 5^2 = 25$$

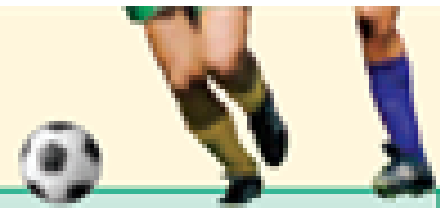
- c. Find a counterexample to disprove:

"Supplementary angles are always adjacent."



Which conjecture could a high school athletic director make based on the graph at the right?

- (A) More boys play soccer than girls.
- (B) More girls are playing soccer today than in 1995.**
- (C) More people are playing soccer today than in the past because the 1994 World Cup games were held in the United States.
- (D) The number of girls playing soccer was more in 1995 than in 2001.





Homework:

p 75 - 78

#'s 1, 2, 3-27 odd,
32, 34, 43-46, 49