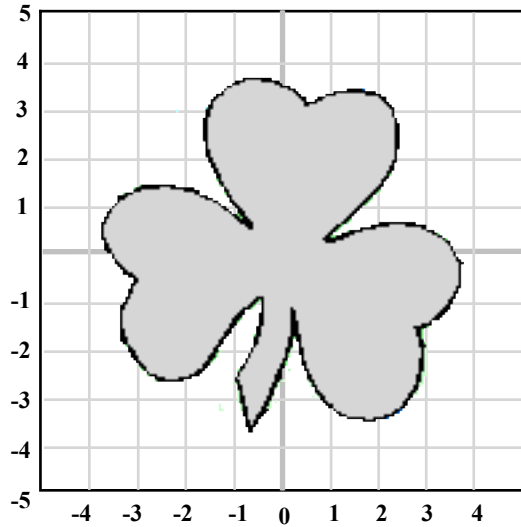


# COUNTDOWN Challenge

October 25, 2007

## Direct and Indirect Measurement of Area

### Direct Estimate



Find the area of the shamrock by counting squares.

Color all the unshaded squares red.

# of unshaded squares \_\_\_\_\_ Multiply # by 1 \_\_\_\_\_

Color all the squares that are half shaded yellow.

# of 1/2 shaded squares \_\_\_\_\_ Multiply # by 1/2 \_\_\_\_\_

Color all the squares that are less than half shaded blue.

# of 1/4 shaded squares \_\_\_\_\_ Multiply # by 1/4 \_\_\_\_\_

What is the total area of the large square? \_\_\_\_\_

Subtract the total # of colored squares? \_\_\_\_\_

Area of shamrock = \_\_\_\_\_

### Indirect Estimate

You can use an indirect method of measurement to find the area of the shamrock by using chance or probability. The ordered pairs listed here have been determined by flipping two coins (heads+ and tails -) and rolling two dice (1=1, 2=2, 3=3, 4=4, 5=5, 6=0). The more points you plot, the more accurate your estimate. Find the total number of points inside the shamrock represented by the 25 trials.

Express the total as a fraction.

$$\frac{\text{Points inside shamrock}}{\text{Total \# of points}} = \frac{\quad}{25}$$

To estimate the shamrock's area, multiply the fraction by 100 (total # of unit squares in large square).

#	Coordinates	Inside Shamrock	#	Coordinates	Inside Shamrock
1	(+2, +2)	√	14	(+2, 0)	
2	(+1, +4)		15	(+4, - 5)	
3	(- 4, - 4)		16	(+5, +4)	
4	(- 2, +2)		17	(+5, - 4)	
5	(- 3, +4)		18	(- 3, - 4)	
6	(- 2, - 2)		19	(- 1, 0)	
7	(0, - 1)		20	(- 1, +5)	
8	(-3, 0)		21	(- 1, +2)	
9	(+1, +2)		22	(- 2,+4)	
10	(0, - 3)		23	(- 3, +1)	
11	(+3, -1)		24	(0, +4)	
12	(+4, +3)		25	(+4, +5)	
13	(- 3,+5)				