

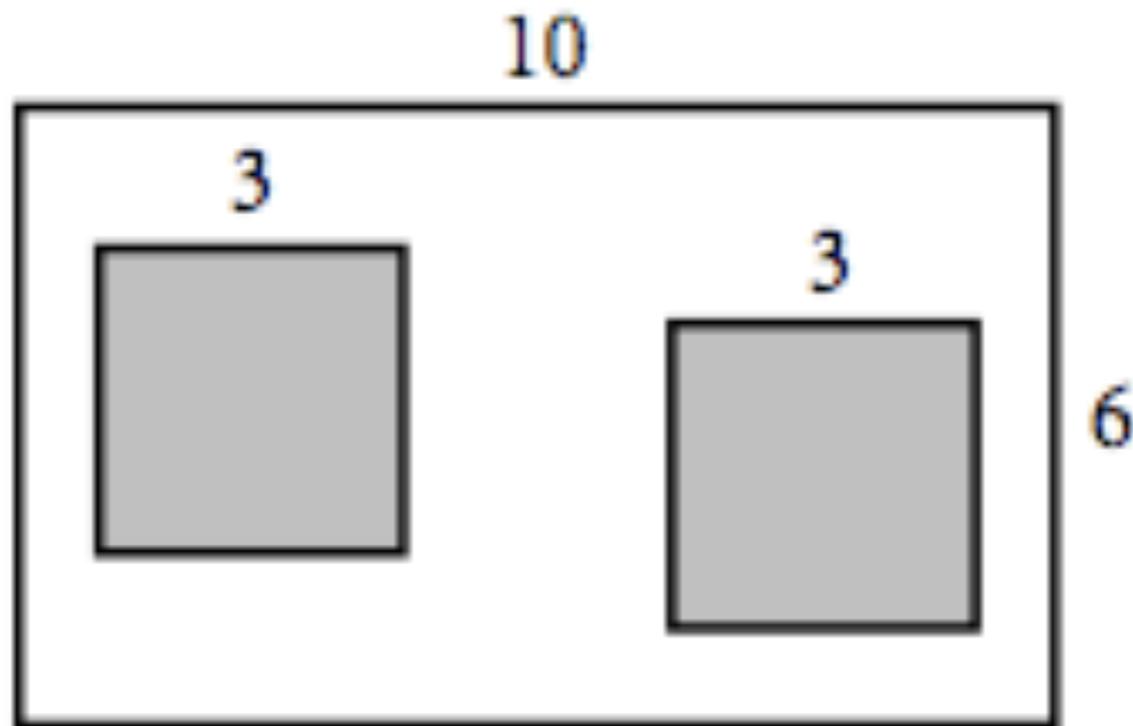
# **Algebra 1**

## **Predicting Patterns & Examining Experiments**

**Unit 6: Around the Plane**  
**Section 5: Take Your Best Shot**

Section 5 is all about applications to area, especially probability as it

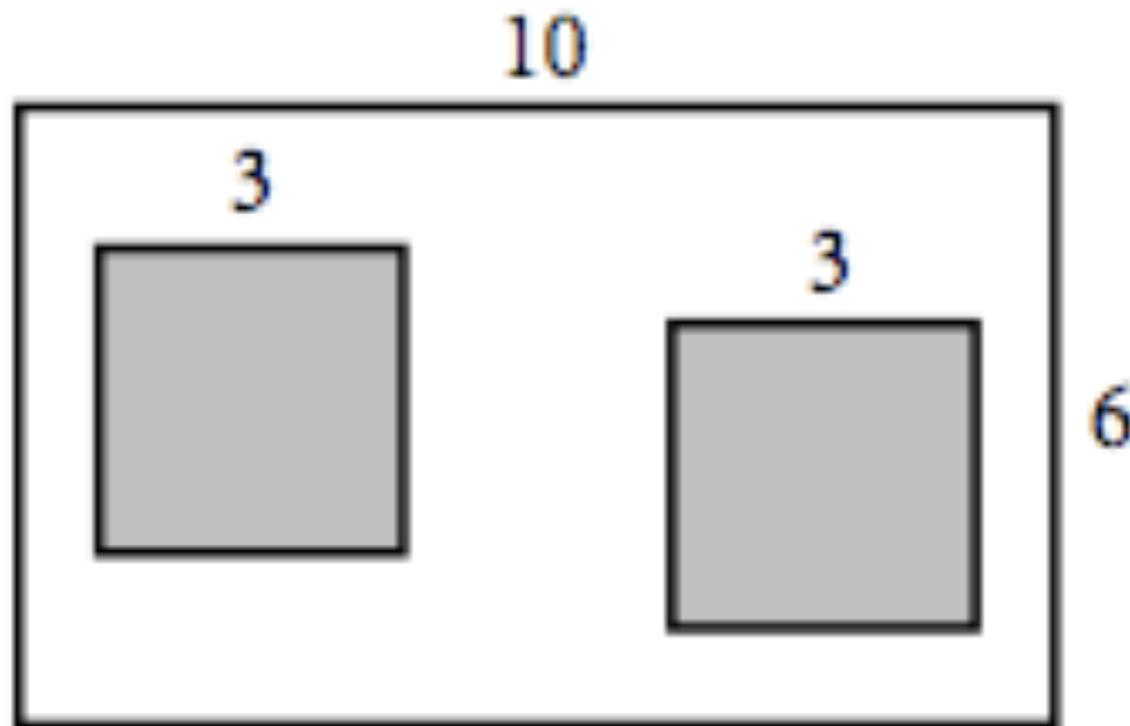
What percentage of the area of the big rectangle is **NOT** covered by the shaded squares?



(Small group discussion) We will use this question of percentages to introduce probability. First we need to find the areas:

What percentage of the area of the big rectangle is **NOT** covered by the shaded squares?

Area of the Big Rectangle =  $10 \cdot 6 = 60$  square units



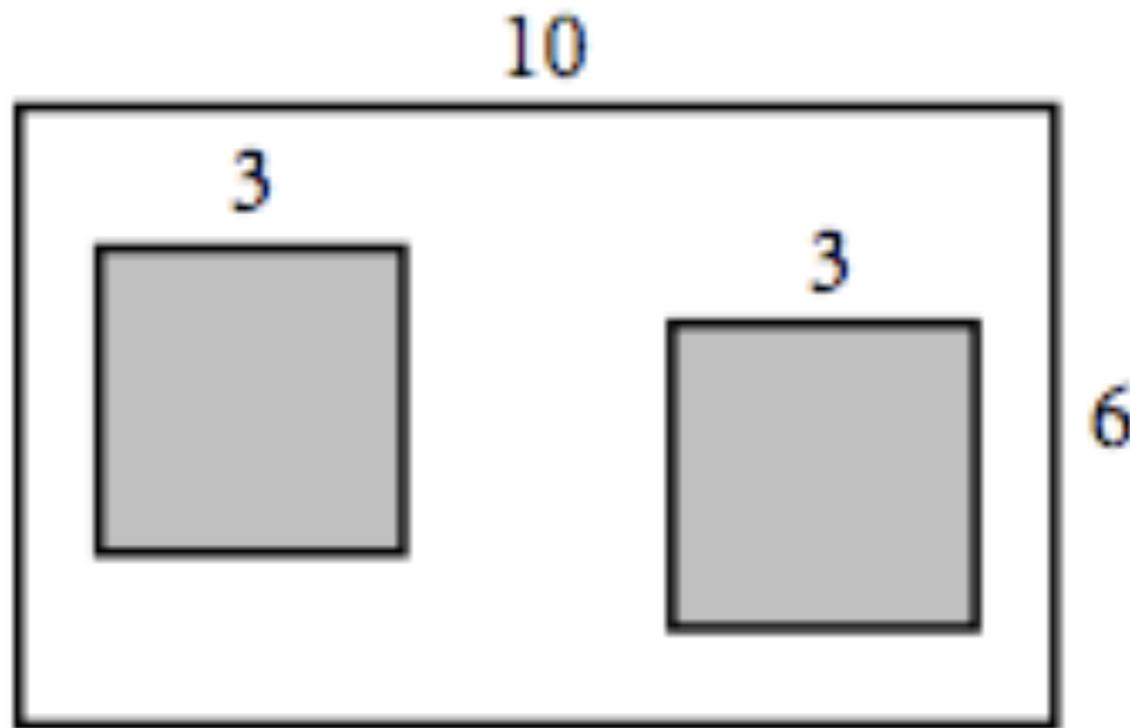
Solution process.

What percentage of the area of the big rectangle is **NOT** covered by the shaded squares?

Area of the Big Rectangle =  $10 \cdot 6 = 60$  square units

Area of each Small Rectangle =  $3 \cdot 3 = 9$  square units

Area of both Small Rectangles = 18 square units



Solution process.

What percentage of the area of the big rectangle is **NOT** covered by the shaded squares?

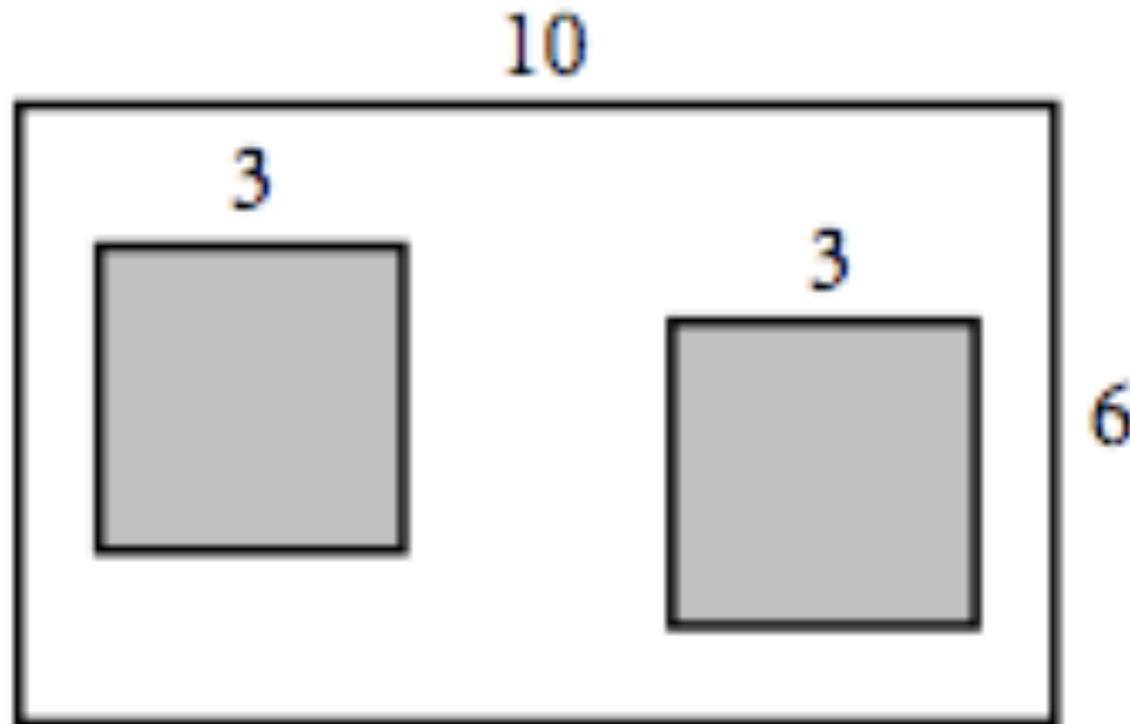
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Area of each Small Rectangle =  $3 \cdot 3 = 9$  square units

Area of both Small Rectangles = 18 square units

Percentage **NOT** covered:

$$\frac{\text{not covered}}{\text{total}} = \frac{60 - 18}{60}$$
$$= \frac{42}{60} = 70\%$$



Solution process.

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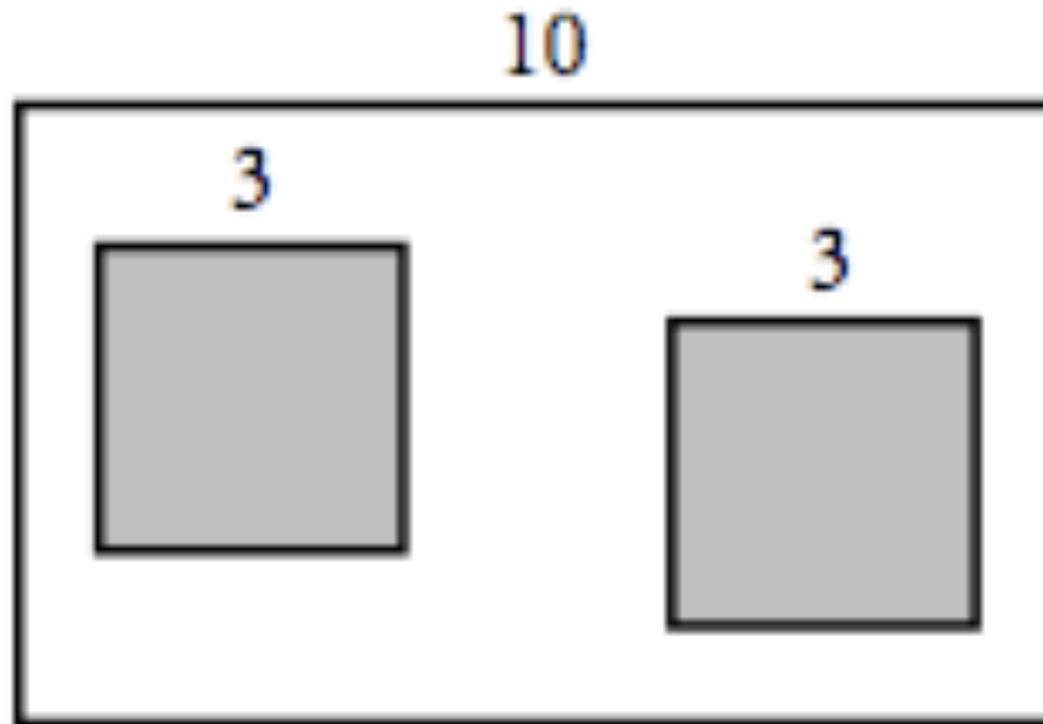
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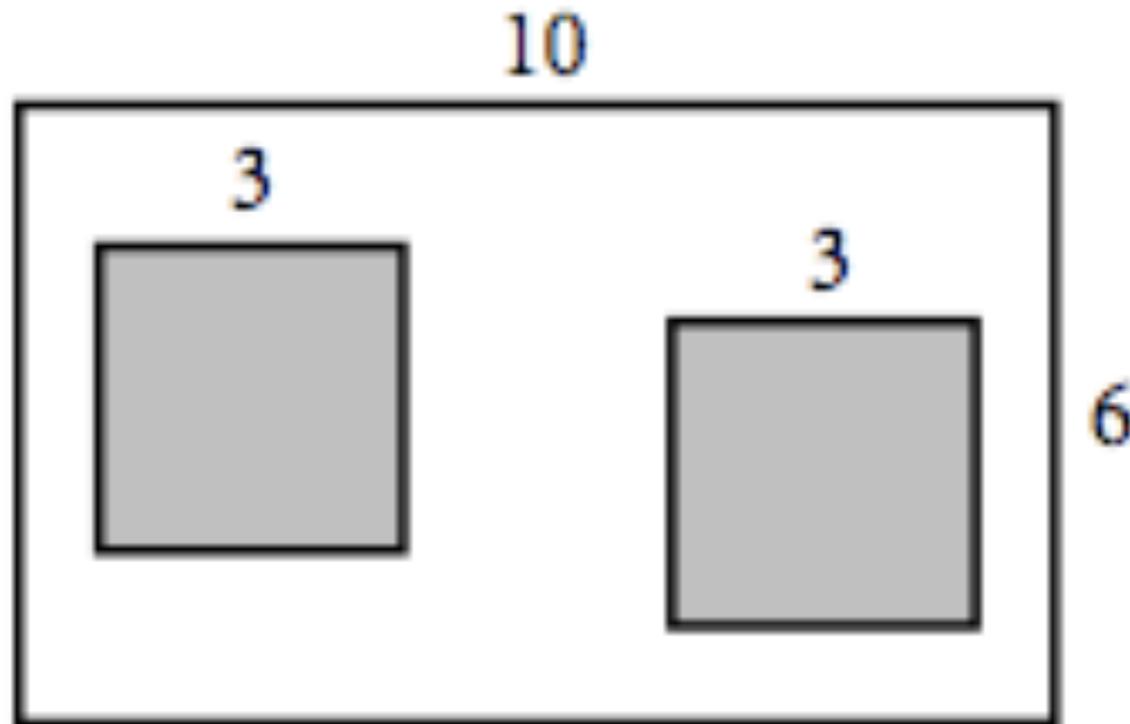


The big rectangle is 70% uncovered by the small squares.

# On Probability

**Probability is how likely something is to happen.**

**Probability is a ratio of  $\frac{\text{event occurring}}{\text{all possible outcomes}}$**

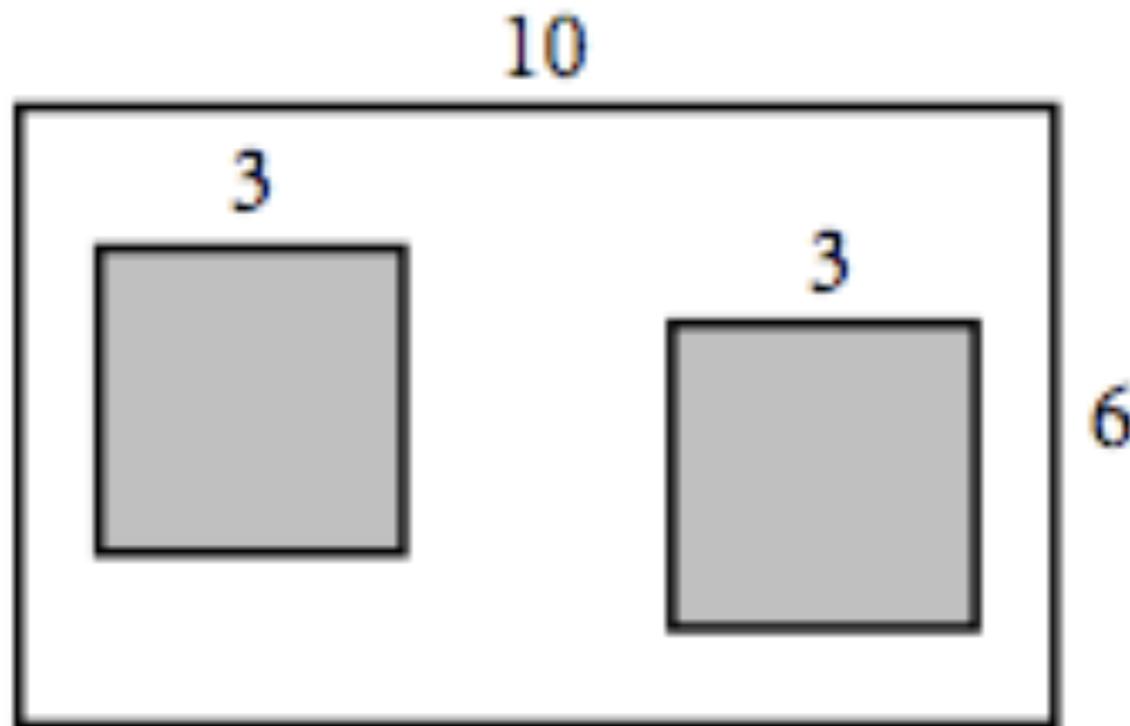


# On Probability

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In this case, I could ask, “What is the probability that a dart thrown at the rectangle will hit in an unshaded portion on the rectangle?”

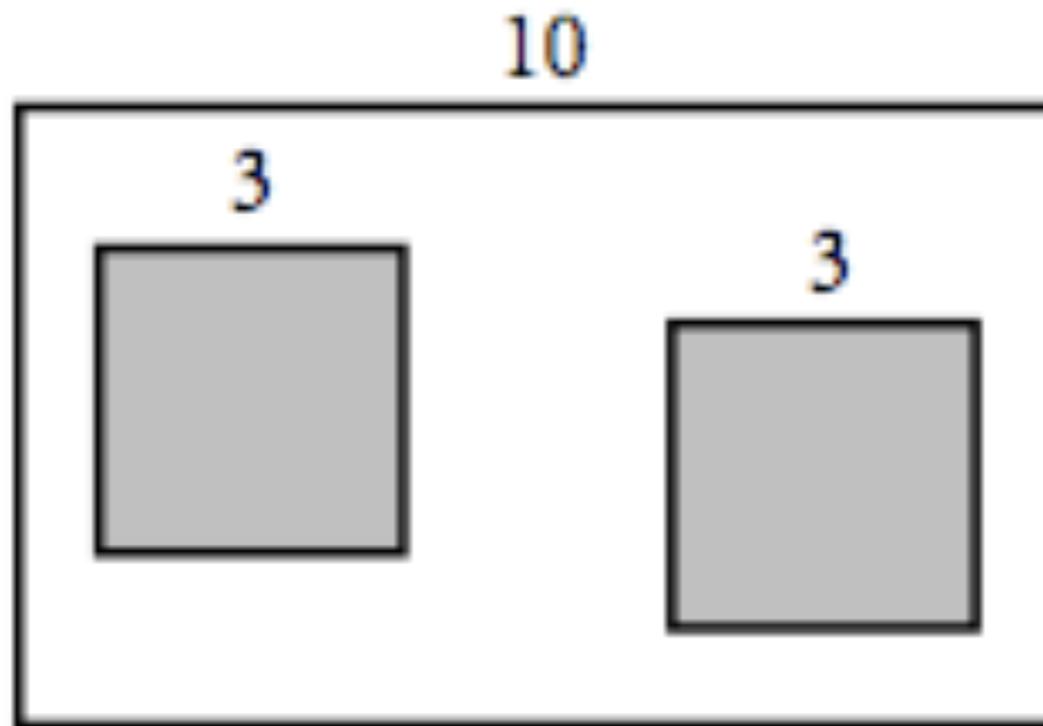


# On Probability

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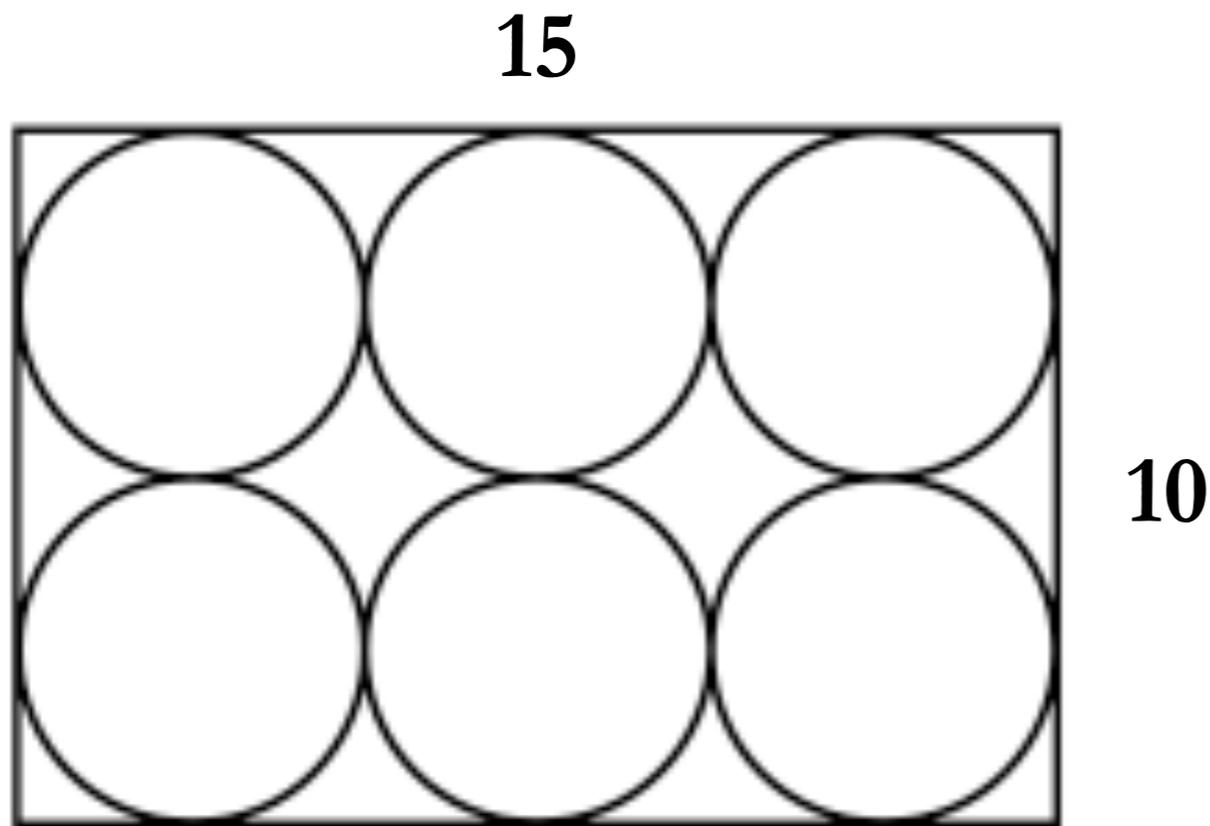
Probability is a ratio of  $\frac{\text{event occurring}}{\text{all possible outcomes}}$

In this case, I could ask, "What is the probability that a dart thrown at the rectangle will hit in an unshaded portion on the rectangle?"



The answer would be that there is a 70% chance of that happening, or a  $\frac{7}{10}$  chance.

What is the probability of landing within a circle?

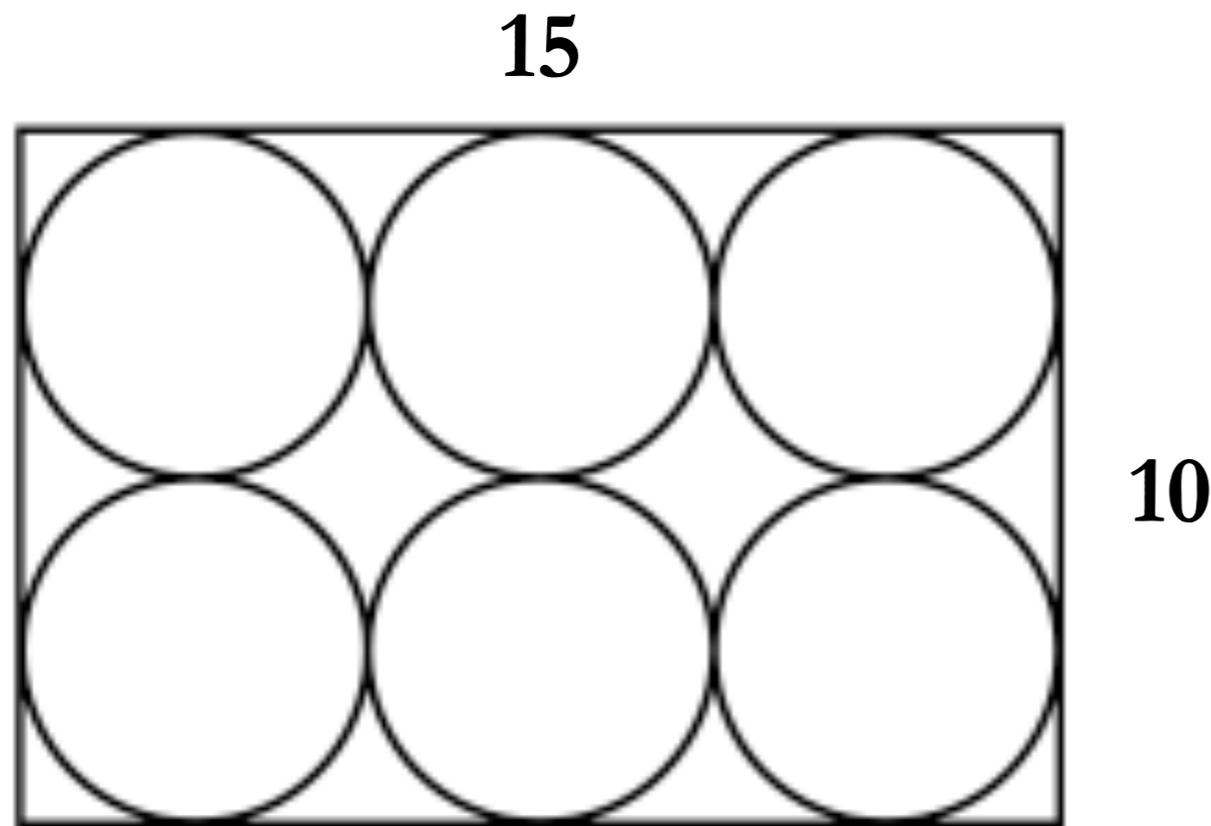


Remember: Area of a circle =  $\pi r^2$

(Small group discussion) Students have enough information to find a solution. Encourage students to break the problem into manageable steps. Have students present their solutions to the class before going over the solution on the next few slides.

What is the probability of landing within a circle?

Area of the big rectangle:  $15 \cdot 10 = 150$  square units



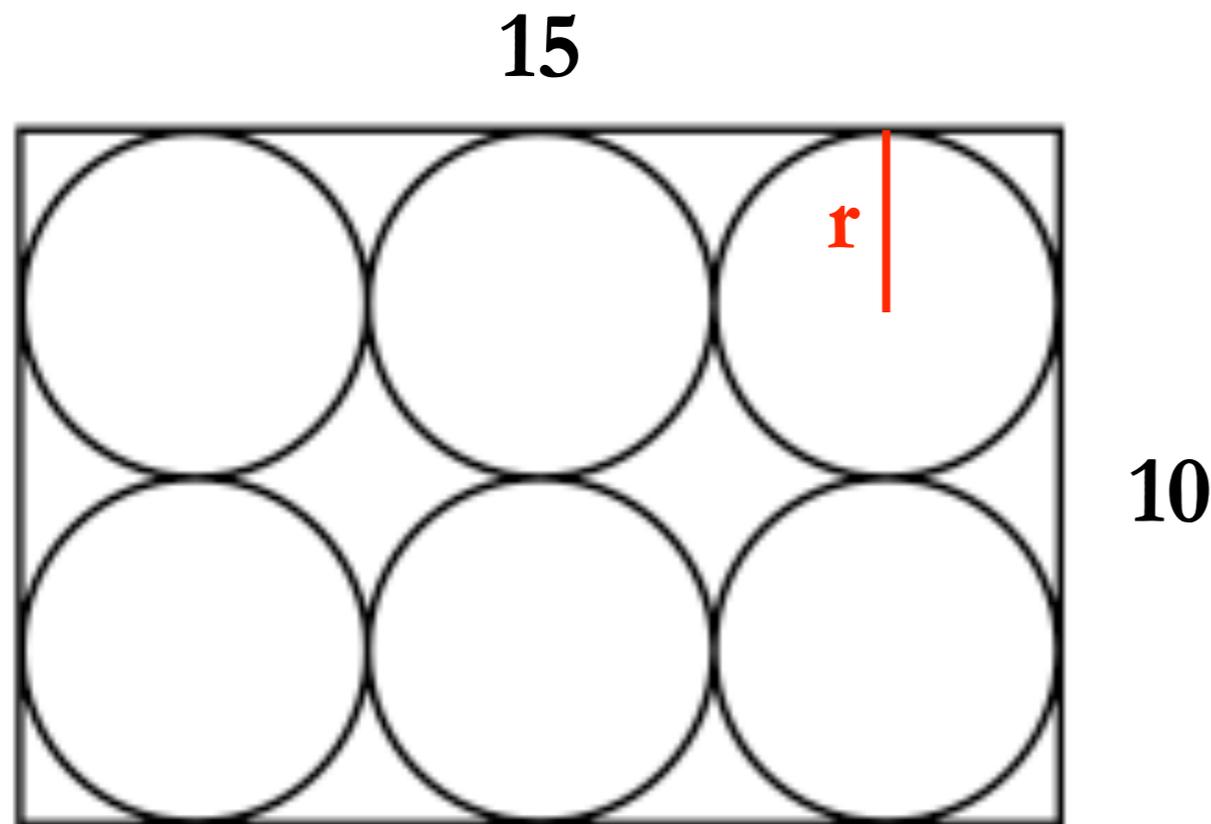
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Solution process.

# What is the probability of landing within a circle?

Area of the big rectangle:  $15 \cdot 10 = 150$  square units

Area of one circle = ...



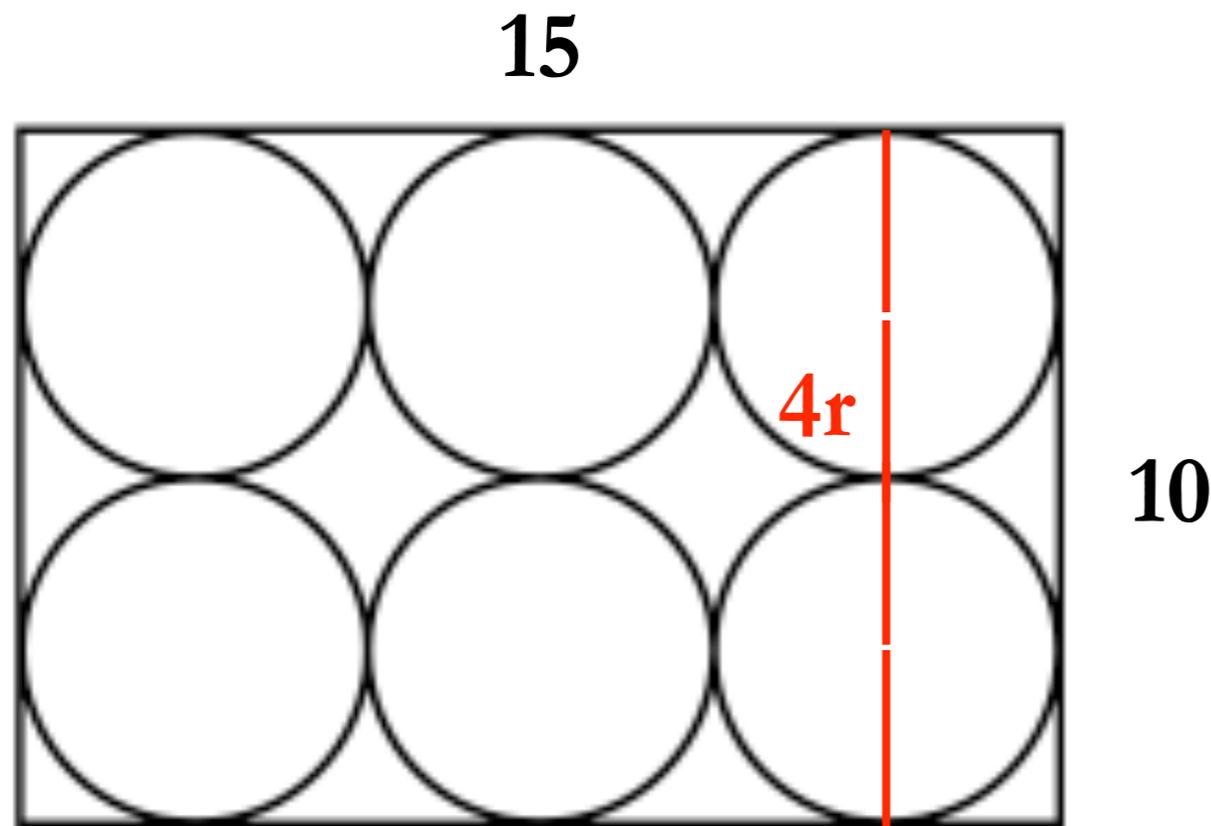
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# What is the probability of landing within a circle?

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**Notice:**  $4r = 10$

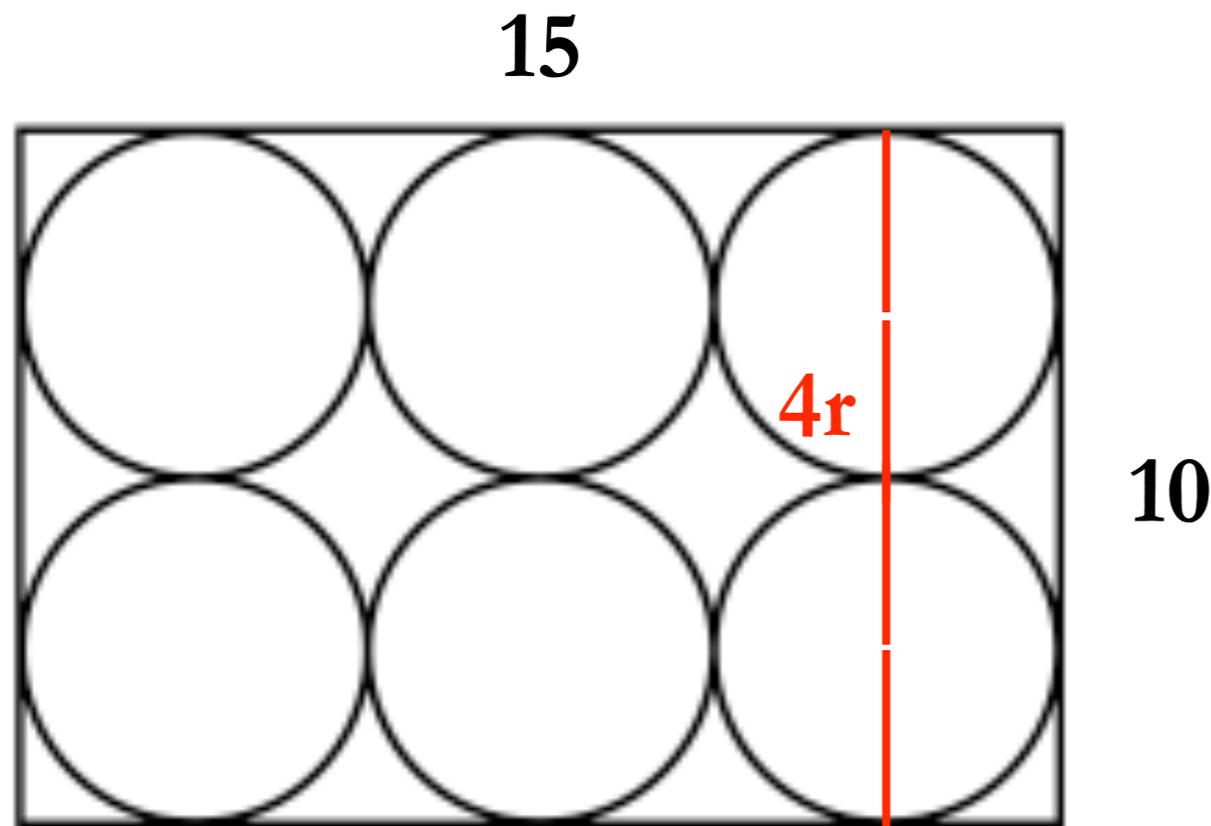
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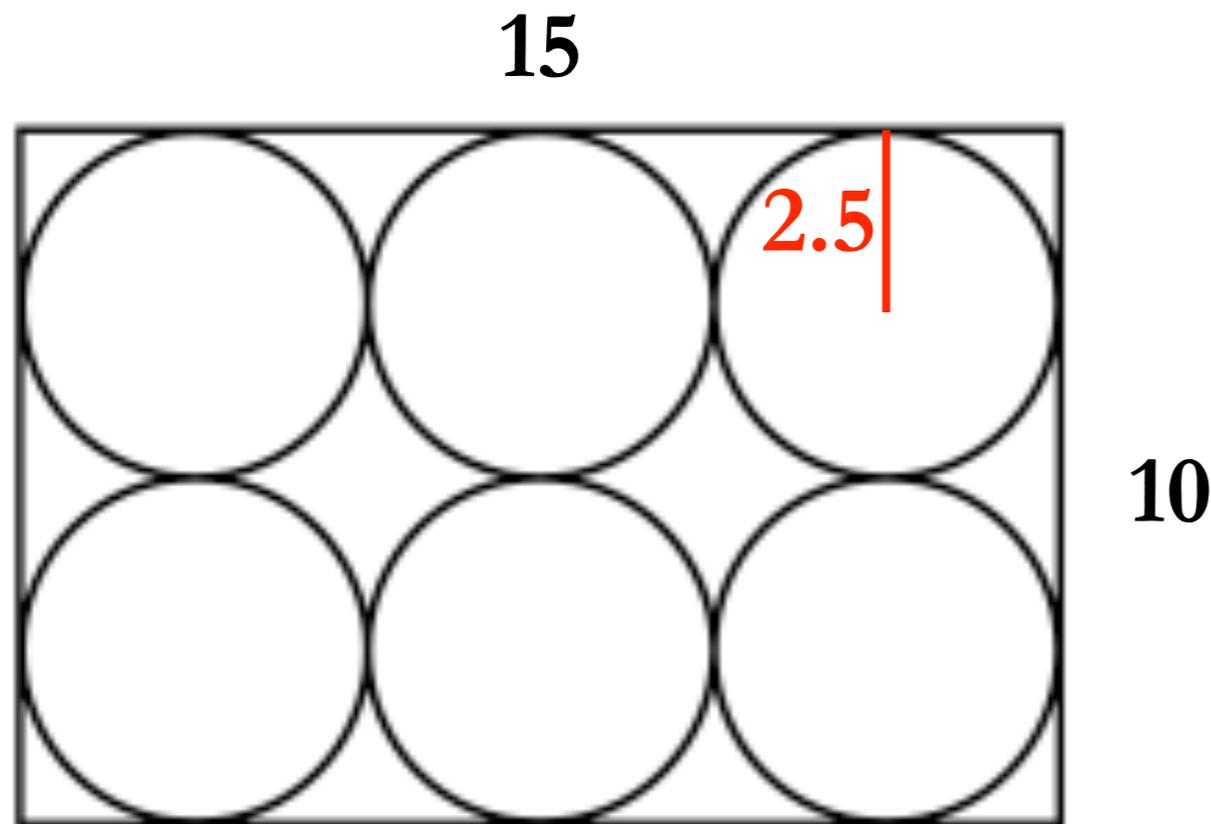
Notice:  $4r = 10$   
Therefore  $r = 2.5$

Remember: Area of a circle =  $\pi r^2$

# What is the probability of landing within a circle?

Area of the big rectangle:  $15 \cdot 10 = 150$  square units

Area of one circle =  $A = \pi (2.5)^2 = 6.25 \cdot \pi$



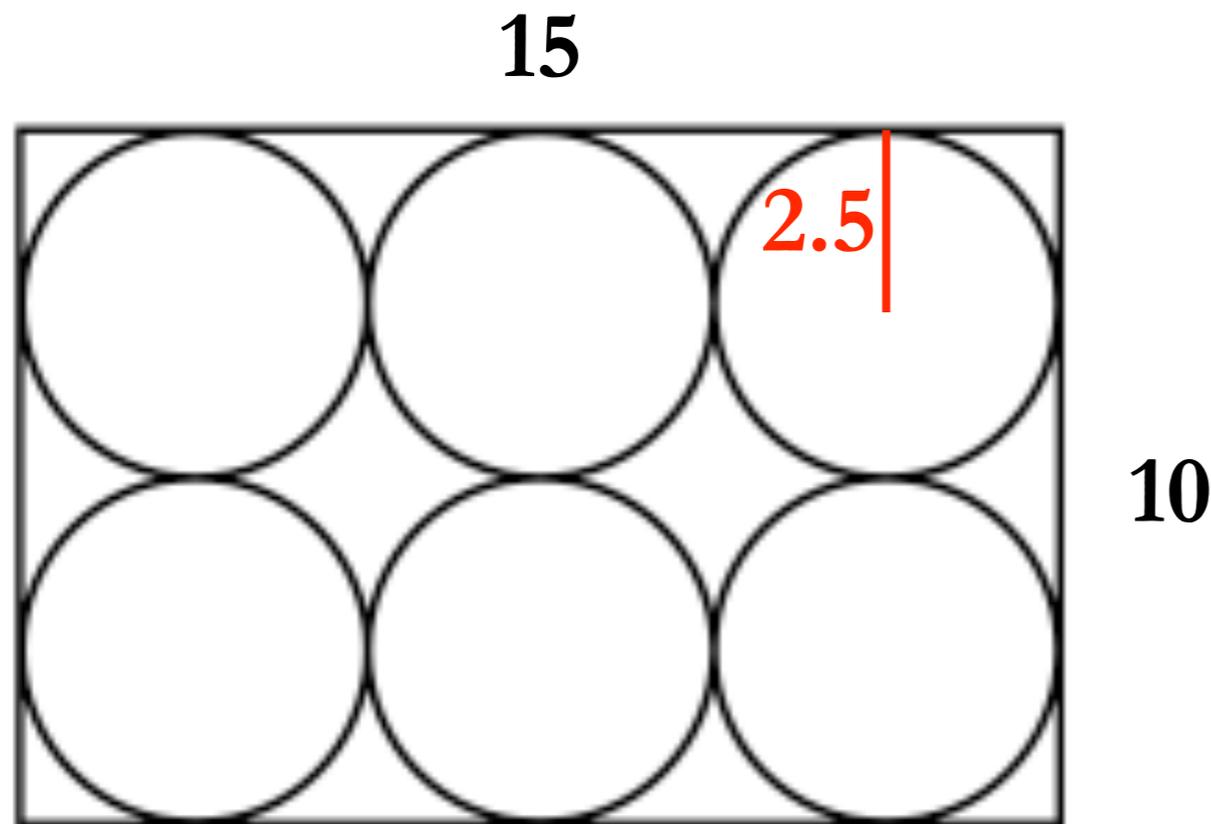
Remember: Area of a circle =  $\pi r^2$

# What is the probability of landing within a circle?

Area of the big rectangle:  $15 \cdot 10 = 150$  square units

Area of one circle =  $A = \pi(2.5)^2 = 6.25 \cdot \pi$

Area of all six circles =  $6 \cdot A = 37.5\pi \approx 117.810$



Probability of landing in a circle:

$$\frac{37.5\pi}{150} \approx .78540$$

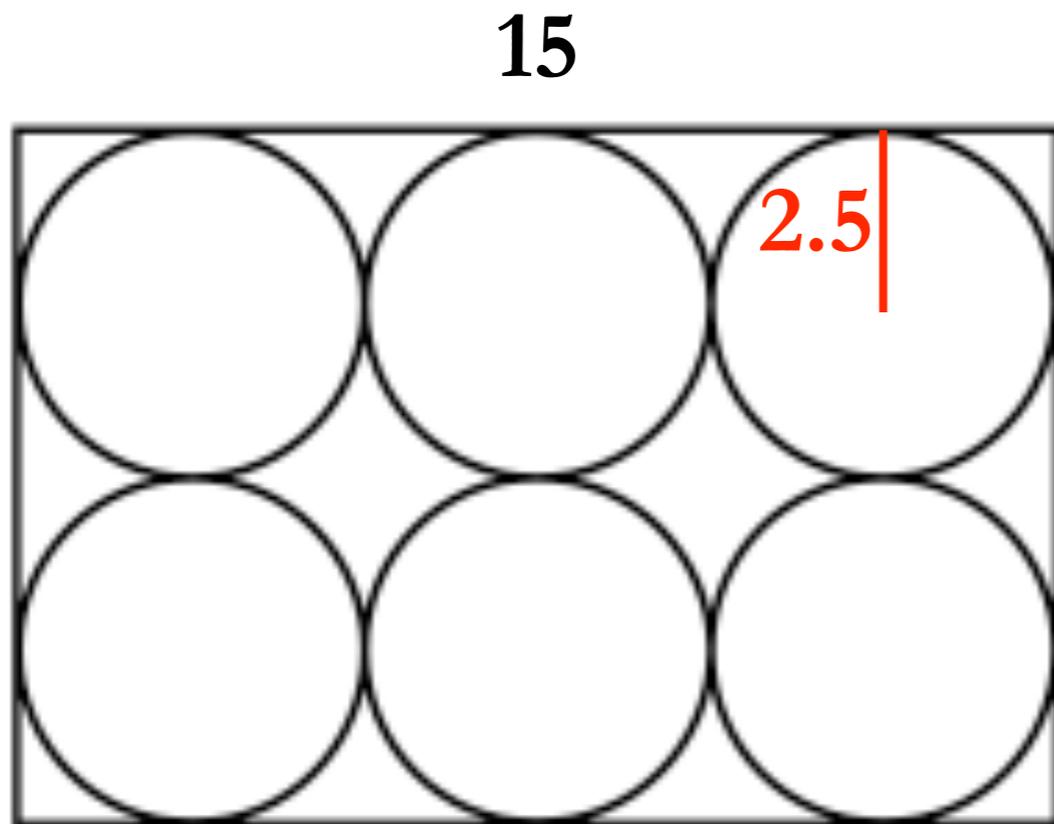
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Probability of landing in a circle:

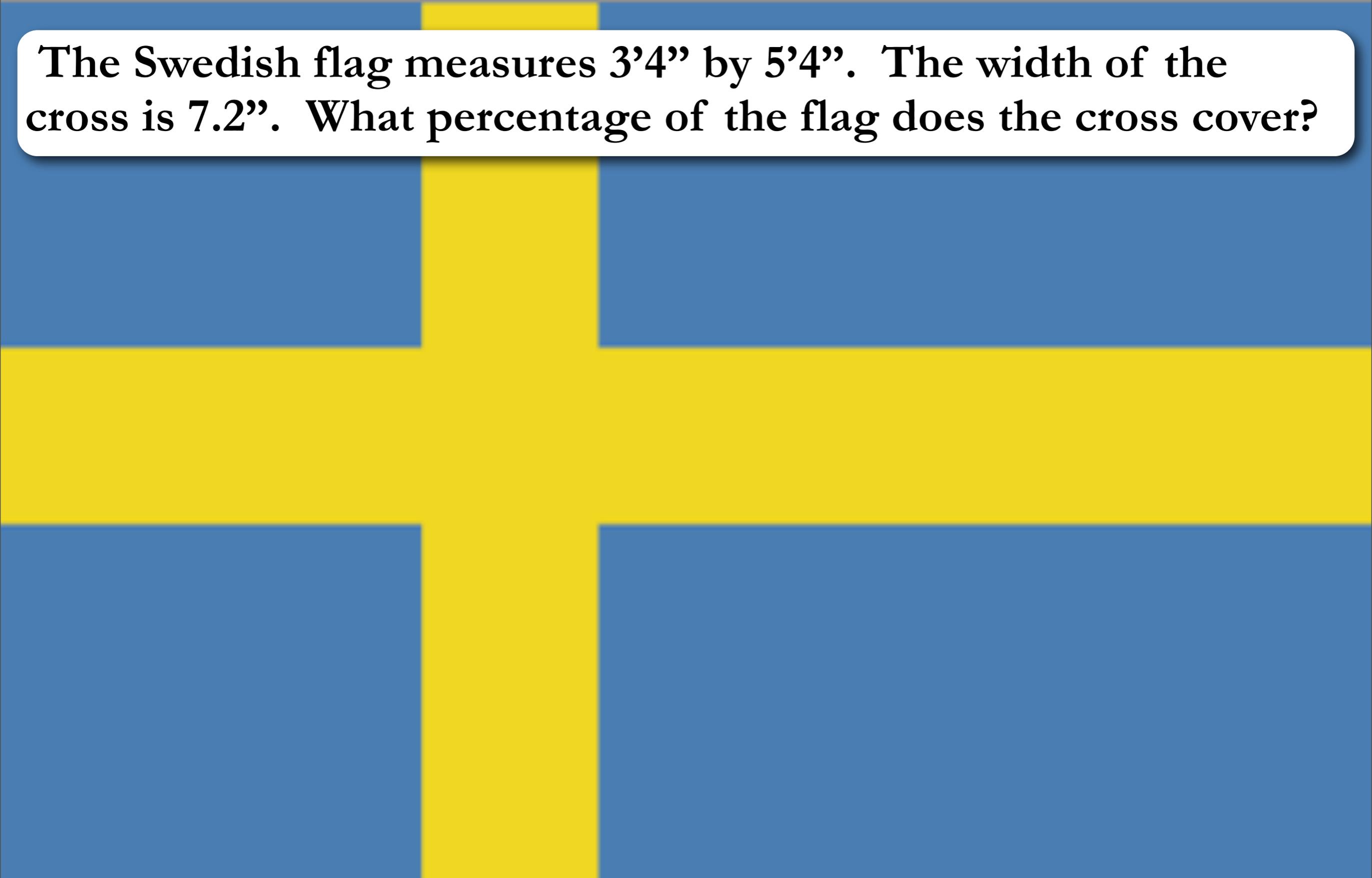
$$\frac{37.5\pi}{150} \approx .78540$$

10 There is a 78.540% chance of landing within a circle.

Remember: Area of a circle =  $\pi r^2$

What percentage of the flag is the cross?

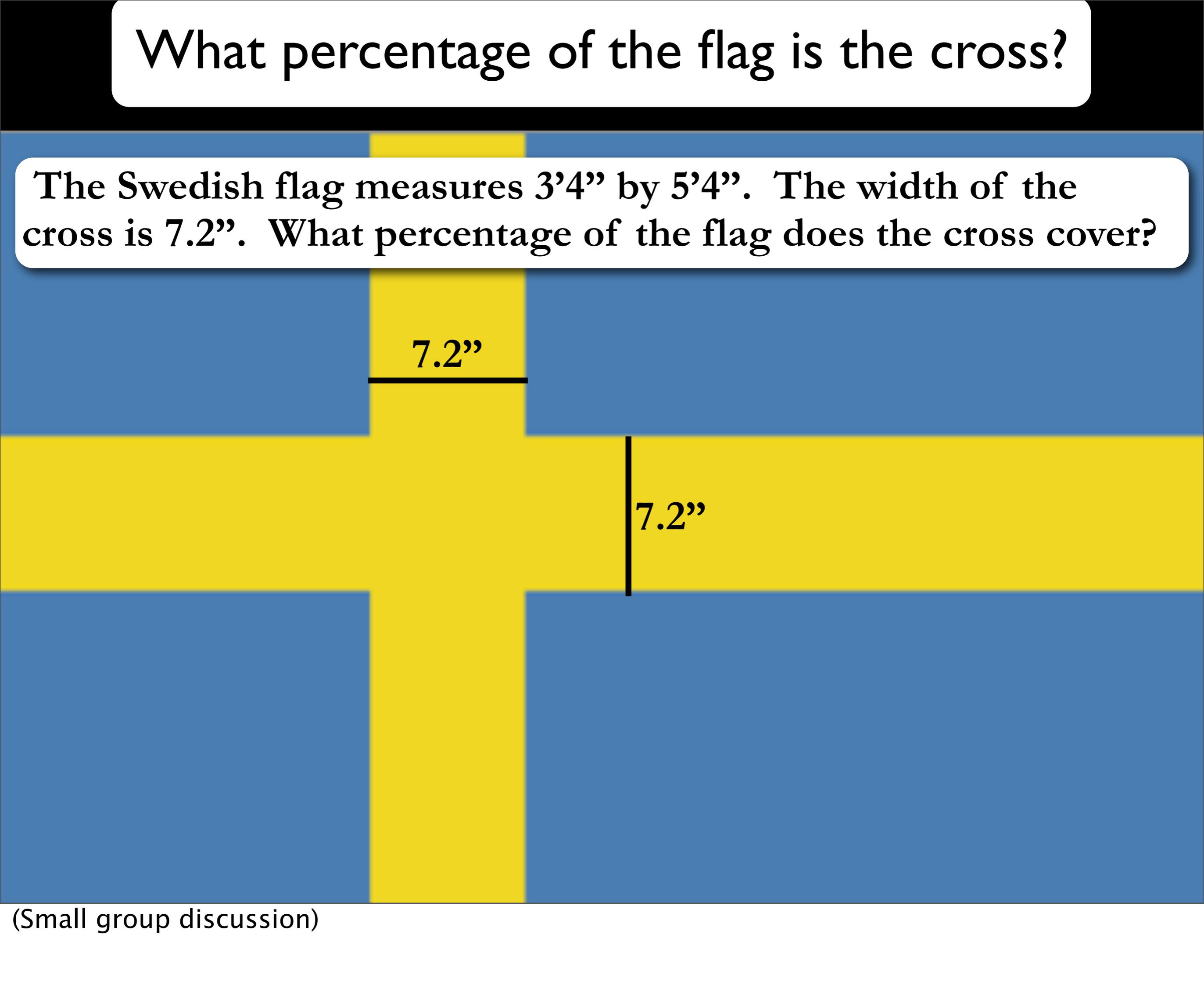
The Swedish flag measures 3'4" by 5'4". The width of the cross is 7.2". What percentage of the flag does the cross cover?



(Small group discussion) The next slide labels the width for clarity, but all necessary information is contained here.

What percentage of the flag is the cross?

The Swedish flag measures 3'4" by 5'4". The width of the cross is 7.2". What percentage of the flag does the cross cover?



7.2"

7.2"

(Small group discussion)

# What percentage of the flag is the cross?

The Swedish flag measures 3'4" by 5'4". The width of the cross is 7.2". What percentage of the flag does the cross cover?

64"



40"

Area of the whole flag  
= 2560 square inches

7.2"

# What percentage of the flag is the cross?

The Swedish flag measures 3'4" by 5'4". The width of the cross is 7.2". What percentage of the flag does the cross cover?

64"



40"

Area of the whole flag  
 $= 2560 \text{ in}^2$

$$\frac{668.16}{2560} = .261$$

7.2"



60"

7.2"



7.2"

$(40 - 7.2)''$   
 $= 32.8''$

Total Area of Cross

$$60 \cdot 7.2 + 7.2 \cdot 32.8 = 668.16 \text{ in}^2$$

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(40-7.2)"  
= 32.8"

7.2"

Total Area of Cross

$$60 \cdot 7.2 + 7.2 \cdot 32.8 = 668.16 \text{ in}^2$$

# What percentage of the flag is the cross?

The Swedish flag measures 3'4" by 5'4". The width of the cross is 7.2". The cross covers 26.1% of the flag.

64"



40"

Area of the whole flag  
= 2560 in<sup>2</sup>

Percentage of cross:

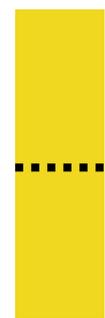
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