"Do Now"

You need your textbook today!!!!!!!
Go Over Tests
<table>
<thead>
<tr>
<th>Area</th>
<th>the amt. of space a shape fills two-dimensional units²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter</td>
<td>the distance around a shape units</td>
</tr>
</tbody>
</table>
We already know how to find the area of a rectangle/square

\[ 5 \times 3 = 15 \]

\[ A = lw \]
\[ A = bh \]

Use base/height from here on
Area Addition Postulate

The area of a region is the sum of the areas of its nonoverlapping parts.
Area Congruence Postulate

If two figures are congruent, then they have the same area.

- Yellow figure: 5 x 3
- Orange figure: 5 x 3
Base vs. Height

Any side can be a base (except for trapezoids - the parallel sides must be the bases).

But not any side can be a height.

Remember, height is the perpendicular distance from the base to the opposite vertex.
Overview of today's lesson

<table>
<thead>
<tr>
<th>ConceptSummary</th>
<th>Areas of Polygons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallelogram</td>
<td>Triangles</td>
</tr>
<tr>
<td><img src="image1" alt="Parallelogram diagram" /></td>
<td><img src="image2" alt="Triangles diagram" /></td>
</tr>
<tr>
<td>$A = bh$</td>
<td>$A = \frac{1}{2}bh$</td>
</tr>
</tbody>
</table>
Stations
Station One: Area of Parallelograms

Key Concept: Area of a Parallelogram

Words: The area \( A \) of a parallelogram is the product of a base \( b \) and its corresponding height \( h \).

Symbols: \( A = bh \)
Station Two: Area of Triangles

**Key Concept: Area of a Triangle**

**Words:**
The area $A$ of a triangle is one half the product of a base $b$ and its corresponding height $h$.

**Symbols:**

$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
Station Three: Area of Trapezoids

**Key Concept  Area of a Trapezoid**

**Words**
The area $A$ of a trapezoid is one half the product of the height $h$ and the sum of its bases, $b_1$ and $b_2$.

**Symbols**

$$A = \frac{1}{2}h(b_1 + b_2)$$
Station Four: Area of Rhombi and Kites

Key Concept: Area of a Rhombus or Kite

Words: The area $A$ of a rhombus or kite is one half the product of the lengths of its diagonals, $d_1$ and $d_2$.

Symbols: $A = \frac{1}{2}d_1d_2$
$A = \frac{1}{2} d_1 d_2$
<table>
<thead>
<tr>
<th>Area of a Parallelogram</th>
<th>Area of a Triangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A = bh )</td>
<td>( A = \frac{1}{2} bh )</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of a Rhombus / Kite</td>
<td>Area of a Trapezoid</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>( A = \frac{1}{2} d_1 d_2 )</td>
<td>( A = \frac{1}{2} (b_1 + b_2)h )</td>
</tr>
<tr>
<td>or ( A = \frac{d_1 d_2}{2} )</td>
<td>or ( A = \frac{(b_1 + b_2)h}{2} )</td>
</tr>
</tbody>
</table>
Find the perimeter and area of each parallelogram or triangle. Round to the nearest tenth if necessary.

1. \( \text{Perimeter} \quad P = 56 \text{ in} \)
   \[ 13 \text{ in} + h = 15 \text{ in} \]
   \[ h = 12 \]
   \[ A = bh \]
   \[ A = 15(12) \]
   \[ A = 180 \text{ in}^2 \]

2. \( \text{Perimeter} \quad P = 76 \text{ ft} \)
   \[ 20 \text{ ft} + 16 \text{ ft} = 36 \text{ ft} \]
   \[ 18 \text{ ft} = 36 \text{ ft} - 20 \text{ ft} \]
   \[ A = bh \]
   \[ A = 18(16) \]
   \[ A = 288 \text{ ft}^2 \]

3. \( \text{Perimeter} \quad P = 64 \text{ cm} \)
   \[ 20 \text{ cm} + h = 12 \text{ cm} \]
   \[ 60^\circ \angle \]
   \[ S = 20 \text{ cm} \]
   \[ h = 10\sqrt{3} \]
   \[ A = bh \]
   \[ A = 12(10\sqrt{3}) \]
   \[ A = 207.8 \text{ cm}^2 \]

4. \( \text{Perimeter} \quad P = 60.1 \text{ m} \)
   \[ 23 \text{ m} + s = 36 \text{ m} \]
   \[ 5 \text{ m} \]
   \[ 45^\circ \angle \]
   \[ A = bh \]
   \[ A = 23(5) \]
   \[ A = 115 \text{ m}^2 \]

5. \( \text{Perimeter} \quad P = 43.5 \text{ in} \)
   \[ 15 \text{ in} + h = 21.5 \text{ in} \]
   \[ 8^2 + 15^2 = 5^2 \]
   \[ 175 = 25 \]
   \[ h = \sqrt{150} \]
   \[ A = \frac{1}{2}bh \]
   \[ A = \frac{1}{2}(5)(\sqrt{150}) \]
   \[ A = 20 \text{ in}^2 \]

6. \( \text{Perimeter} \quad P = 80 \text{ mm} \)
   \[ 20 \text{ mm} + s = 60 \text{ mm} \]
   \[ 12^2 + h^2 = 20^2 \]
   \[ h = 16 \]
   \[ 16^2 + 30^2 = s^2 \]
   \[ s = 34 \]
   \[ A = \frac{1}{2}bh \]
   \[ A = \frac{1}{2}(16)(16) \]
   \[ A = 240 \text{ mm}^2 \]
Find the area of each trapezoid, rhombus, or kite.

1. \[ A = \frac{1}{2} (b_1 + b_2)h = \frac{1}{2} (16 + 6) \times 12 = \frac{1}{2} \times 22 \times 12 = 132 \text{ ft}^2 \]

\[ A = \frac{1}{2} d_1 d_2 = \frac{1}{2} (10)(18) = 90 \text{ m}^2 \]

**ALGEBRA** Find \( x \).

5. \( A = 78 \text{ cm}^2 \)

6. \( A = 96 \text{ in}^2 \)

7. \( A = 104 \text{ ft}^2 \)