

DIG INTO EQUATIONS: A POLYGON PUZZLE

Presented by MathLinks Authors
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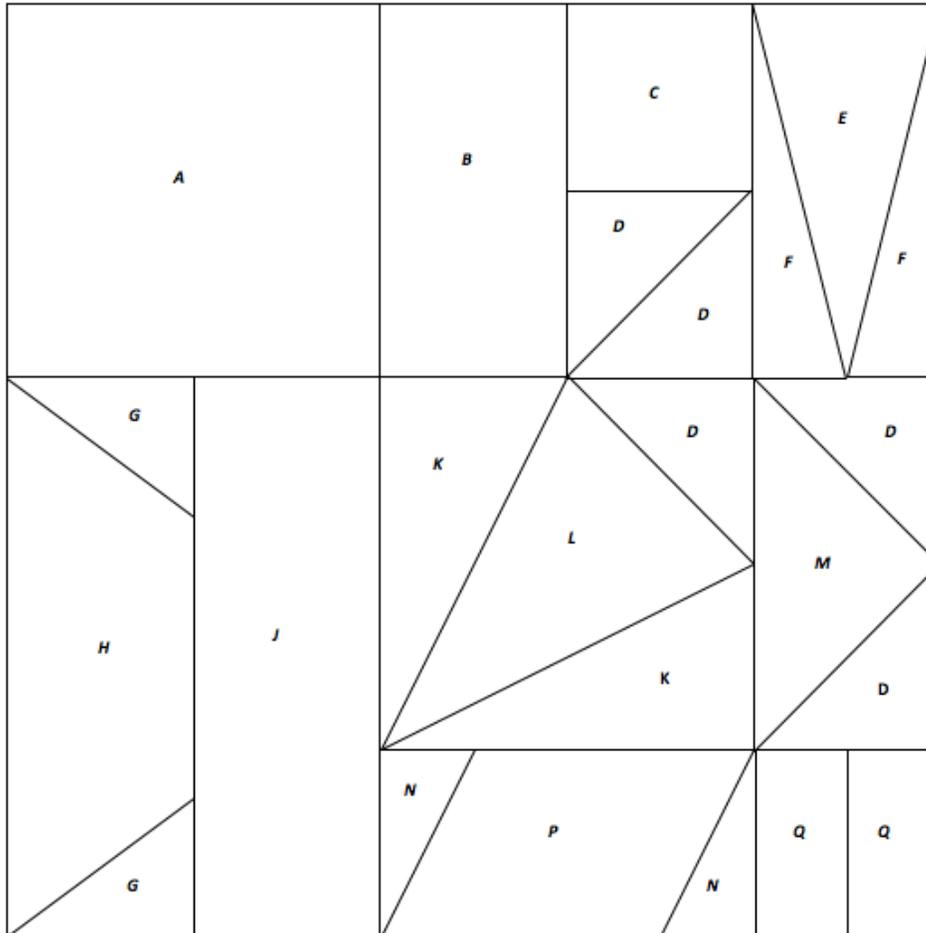
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In this session, we will explore a context that helps students:

- Write algebraic equations
- Evaluate algebraic expressions using substitution

Our polygon puzzle

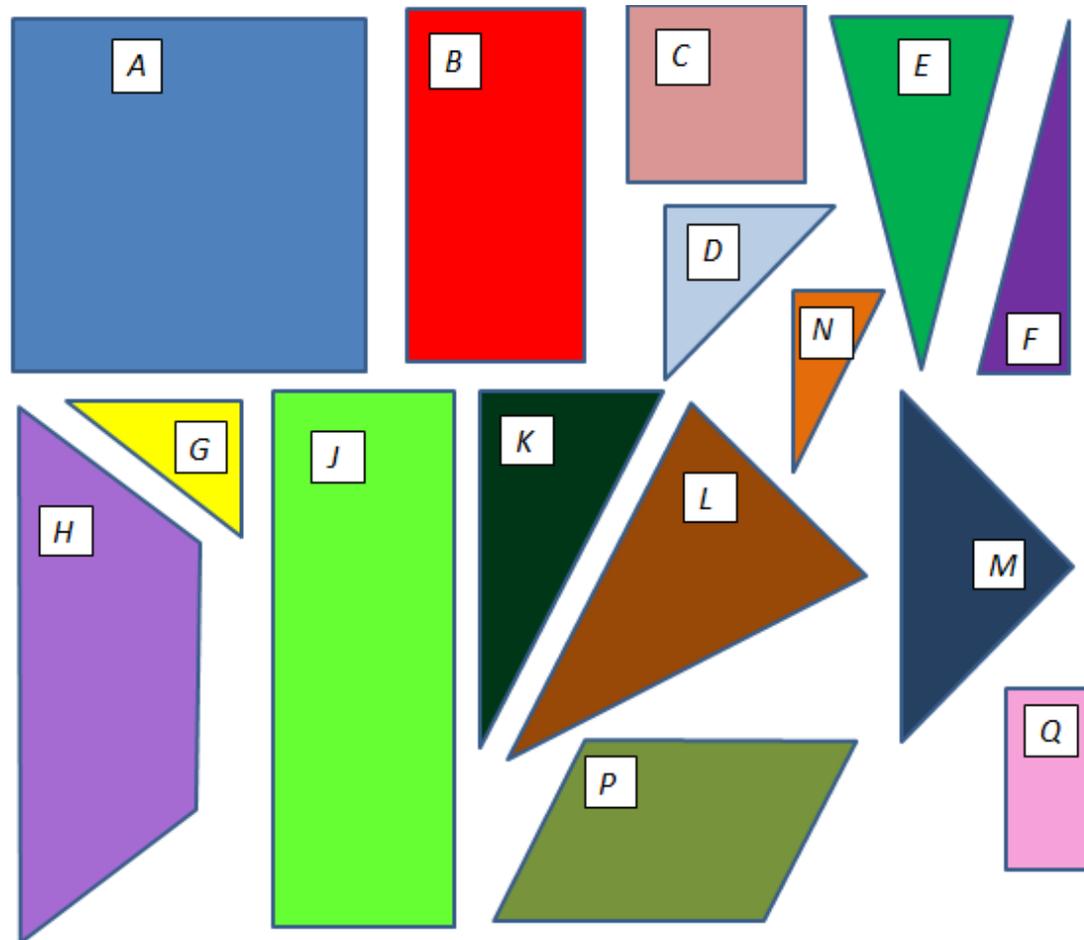


A is a label . It refers to an object – a piece of the puzzle.

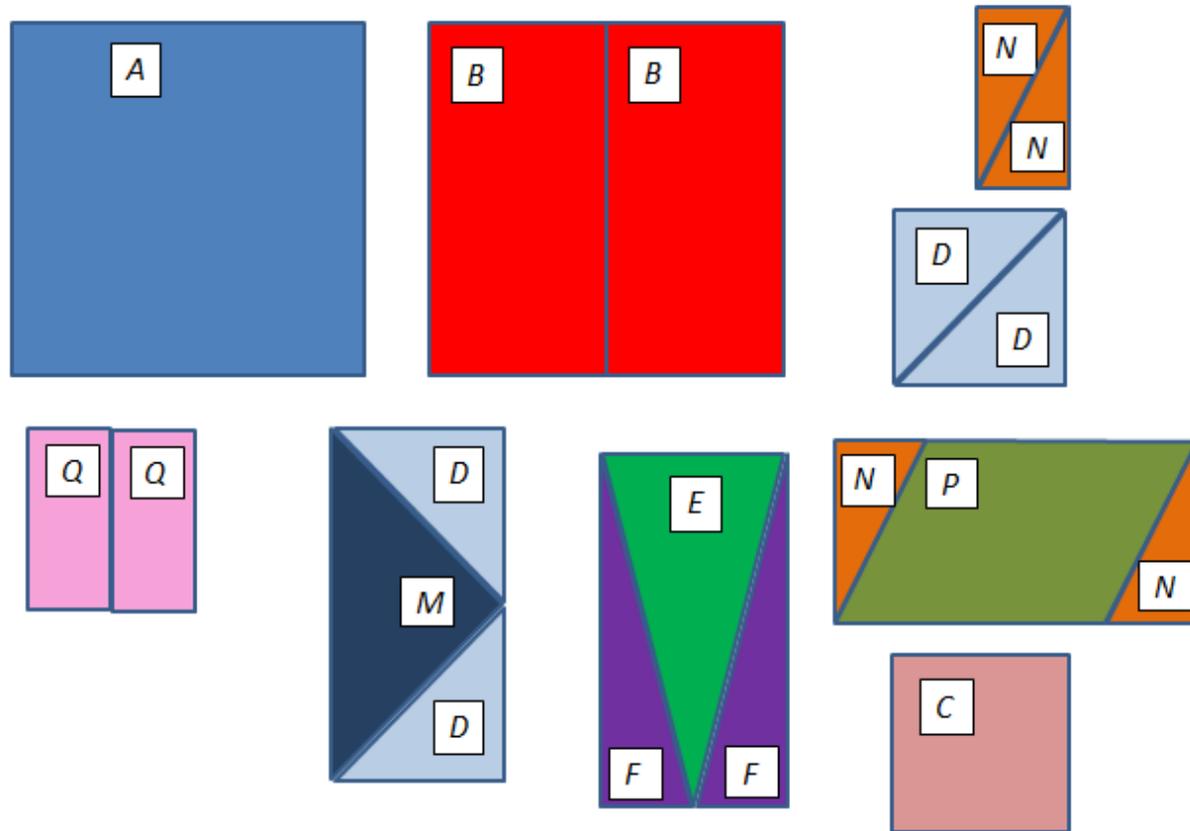
Let **A** = the area of shape A.
This is a variable.

Let's dig in:

Build
polygons
with equal
areas.



A few assembled rectangles.



Write equations to represent polygons with equal areas.

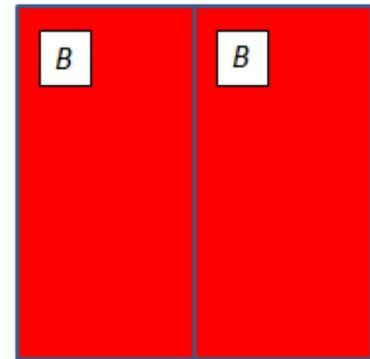
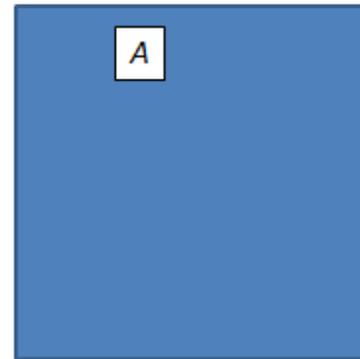
$$A = 2B$$

$$A = B + B$$

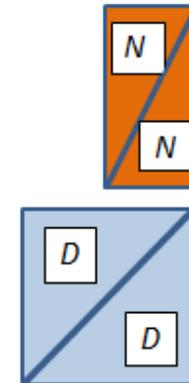
$$B = \frac{1}{2} A$$

$$2D = 4N$$

$$4D = B$$



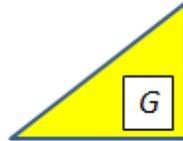
$$\frac{1}{2} A = 4D$$



$$A + 2D = 2B + 4N$$

Given: $H = 36$ sq units

Find G :

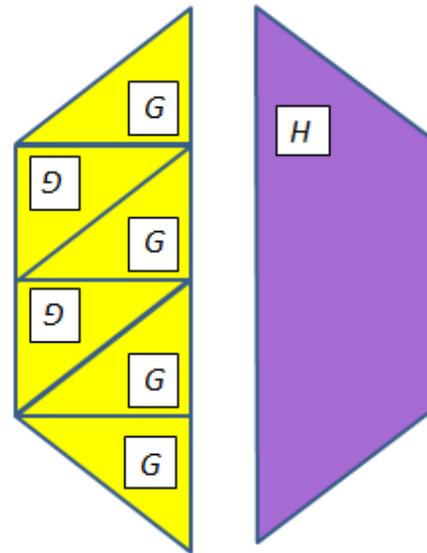


$$H = 6G$$

$$36 = 6G$$

$$6 = G$$

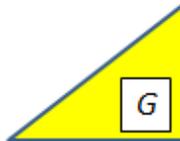
$$G = 6 \text{ sq units}$$



Given: $H = 36$ sq units

Find $\frac{1}{3}J$:

Recall $G = 6$



$$J = H + 2G$$

$$J = 36 + 2(6)$$

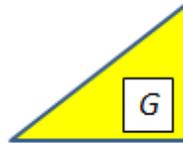
$$J = 48$$

$$\frac{1}{3}J = 16$$



Given: $H = 18$ sq units

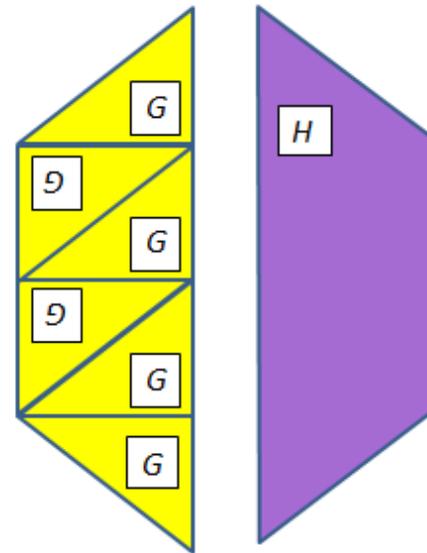
Find G :



$$H = 6G$$

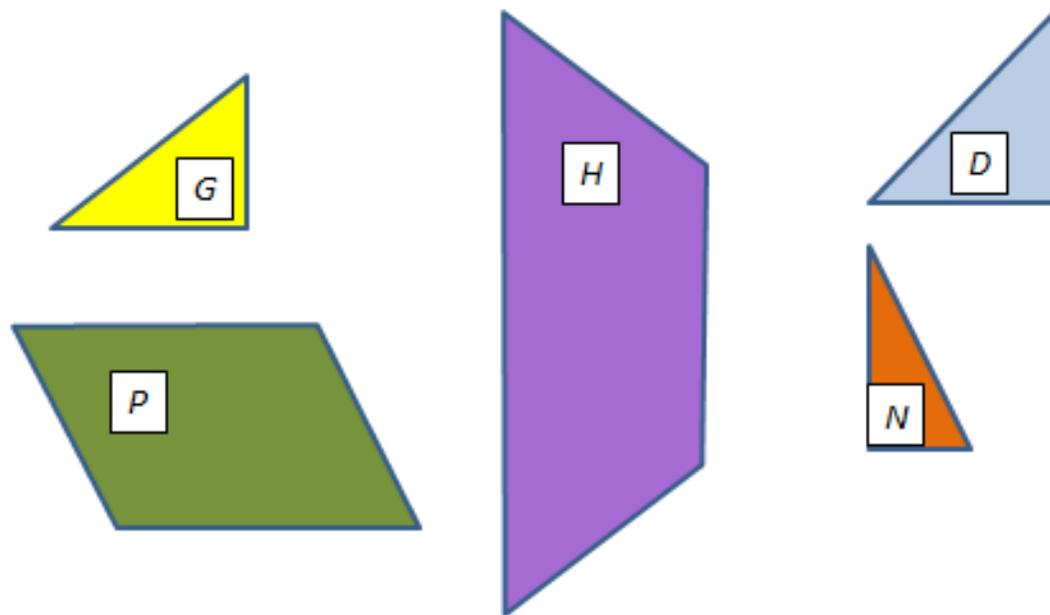
$$18 = 6G$$

$$3 = G$$



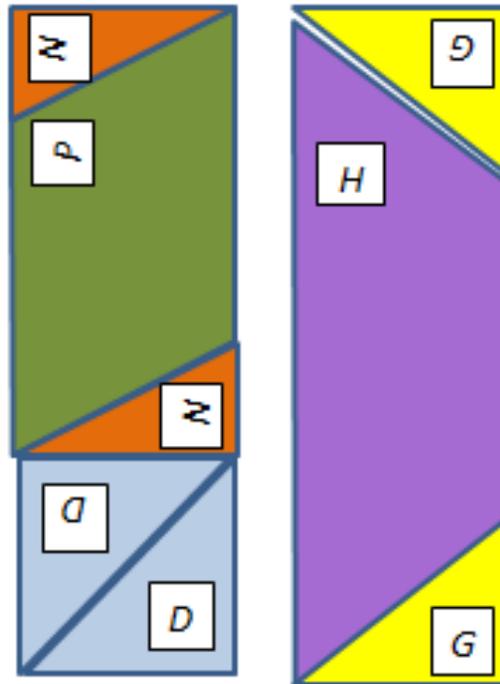
Justification:

Does $2G + H = P + 2(N+D)$? Explain.



Justification:

Does $2G + H = P + 2(N+D)$? Explain.





In this session, we used the polygon puzzle to:

- Write algebraic equations
- Evaluate algebraic expressions using substitution
- Justify mathematical statements

Handout



DIG INTO EQUATIONS: A POLYGON AREA PUZZLE

1. Build equations based upon the areas of the shapes. Record several in the table below.

Example: $A = 2B$.

2. How could you sort these equations into categories?

3. Given: $H = 36$ square units;

$$G = \underline{\hspace{2cm}}; \quad \frac{1}{3}J = \underline{\hspace{2cm}}; \quad A + B = \underline{\hspace{2cm}}$$

4. Explain why $2G + H = P + 2(N + D)$.

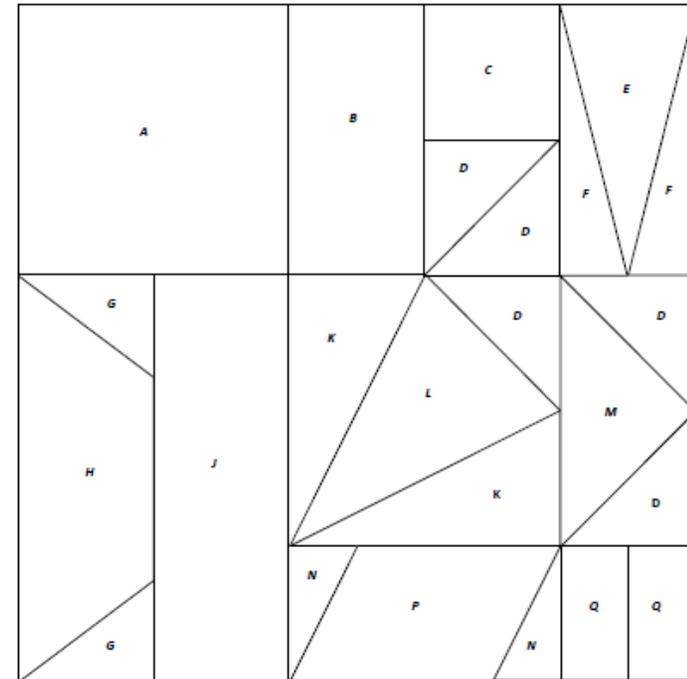
5. Find D if $G = 3$, $H = 18$, $P = 12$, and $N = 2$.

6. Finish the Equation column (the first two are done as examples)

Given expression	Written in terms of this variable	Equation
A	B	$A = 2B$
B	A	$B = \frac{1}{2}A$
$B + C$	D	$B + C = \underline{\hspace{2cm}}$
J	A	
$2(B + C)$	J	

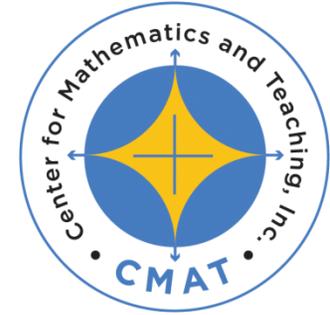
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POLYGON PUZZLE PIECES



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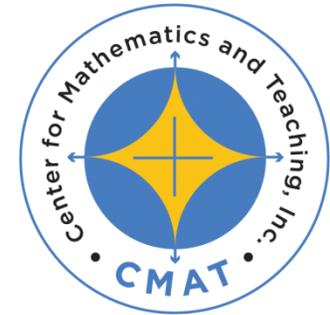
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THANK YOU!

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