Mini-Project B: Project Euler Problem 45 - Triangular, Pentagonal, and Hexagonal

Problem: Triangular, pentagonal, and hexagonal (adapted from Project Euler Problem 45)

Triangular, pentagonal, and hexagonal numbers are generated by the following formulae:

Name	Function	First five values
Triangle	$T(n)=n(n+1)/2$	1, 3, 6, 10, 15, ...
Pentagonal	$P(n)=n(3n-1)/2$	1, 5, 12, 22, 35, ...
Hexagonal	$H(n)=n(2n-1)$	1, 6, 15, 28, 45, ...

We can see that $T(5)=H(3)=15$ so 15 is both triangular and hexagonal.

We can also see that $T(1) = P(1) = H(1) = 1$ so 1 is triangular, pentagonal, and hexagonal.

Find the next triangular number that is also pentagonal, and hexagonal.

Support: Students will need to learn/know: if statements, functions, and while loops.

Standard addressed: F-IF2 - Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.