



<http://topdrawer.aamt.edu.au/Reasoning/Big-ideas/Mathematical-truth/Truth-of-propositions/Do-quadrilaterals-tessellate>

Some statements to use with Years 5–10 students, asking questions such as:

Is (this proposition) true?

Is it just sometimes true, or is it or always true?

When is it true?

How do you know?

How could we demonstrate/show/prove that it is true?

- Triangles tessellate.
- Pentagons tessellate.
- Hexagons tessellate.
- Area = length $\times$ width
- $5 + 5 = 13$
- Volume = area of the end $\times$ length
- If the water in our dams increases by 10% this month, and then decreases by 10% next month, it will be back to where it started.
- If you add the same number to the top and the bottom of a fraction, the fraction gets bigger in value.
- If you add n consecutive numbers together, the result is divisible evenly by n .
- The square of a prime number is one more than a multiple of 24.
- Two odd numbers add to give an even number.
- Two prime numbers add to give another prime number.
- The probability of an outcome = $\frac{1}{\text{the number of different possible outcomes}}$.
- When tossing a coin, if the result has been HHHHHHH, then it is likely that the next result will be T.
- The person sitting next to me likes chocolate.
- The sum of a multiple of 3 and a multiple of 5 is divisible evenly by 15.
- The circumference of a cylinder is greater than its height.
- • All hexagons tessellate.
- A graph of $3n + 4$ will always be a straight line that always crosses the y -axis at 4.

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Some statements to use with Years 1–4 students, exploring with equipment and practical examples

- When are they true? Why?
- When they are not true? Why?
- When they are sometimes true? Why?
- Many of the above statements may also be used or adapted.
- Squares tessellate.
- Parallelograms tessellate.
- If you add 3 consecutive numbers together, the result is divisible evenly by 3.
- If you add 4 consecutive numbers together, the result is divisible evenly by 2.
- Two even numbers add to give an even number.
- The sum of a multiple of 3 and a multiple of 2 is divisible evenly by 6.
- The person sitting next to me likes football.
- If two coins are tossed lots of times, two heads will result about $\frac{1}{3}$ of the time, two tails will result about $\frac{1}{3}$ of the time, and one head/one tail will result about $\frac{1}{3}$ of the time.
- The mean of three consecutive numbers is the middle number.
- Pineapples grow in Alaska.
- The area of Greenland is larger than the area of Western Australia.
- If you double numbers then add 6, then graph the results, the graph line will always be straight.
- Encourage both primary and secondary students to adapt these propositions and to make up others to explore. Remember that the emphasis is on reasoning. (When is it true, and why?)