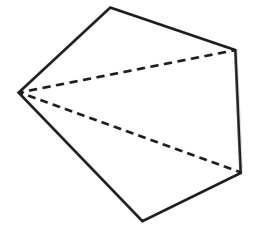# Find and use the angle sum of any polygon
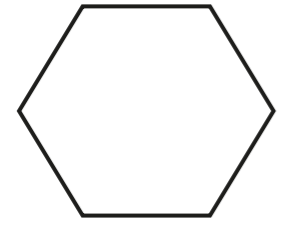
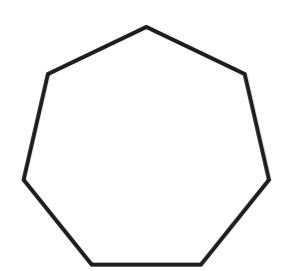**H**

I The sum of the interior angles of a triangle is 180°.

Split the polygons into triangles to work out the sum of their interior angles. Your lines should not overlap.

The first one has been done for you.

a)

number of sides = | 5 |

number of triangles = | 3 |

3 × 180 = | 540 |

The sum of the interior angles of a pentagon is | 540° |

b)

number of sides = | |

number of triangles = | |

| | × 180 = | |

The sum of the interior angles of a hexagon is | |

c)

number of sides = | |

number of triangles = | |

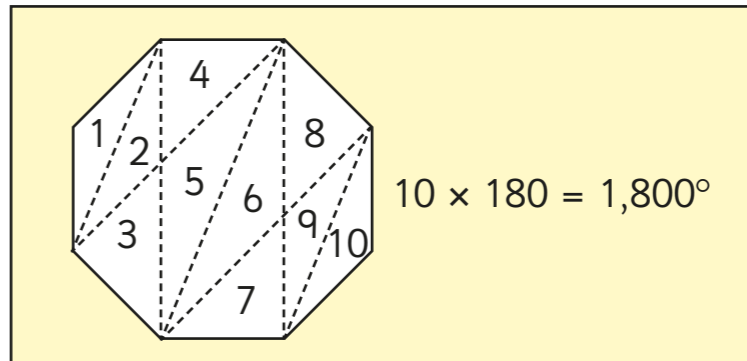| | × 180 = | |

The sum of the interior angles of a heptagon is | |

What do you notice about the number of sides compared to the number of triangles?

2 Complete the table.

Shape	Number of sides	Number of triangles	Sum of interior angles
quadrilateral	3	2	360°
pentagon			
nonagon			
decagon			
	6		
		6	
			1,800°

Compare answers with a partner.

3 Dani is working out the sum of the interior angles of a polygon.

Here are her workings.
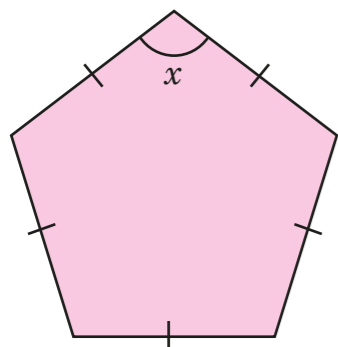
10 × 180 = 1,800°

Do you agree with Dani? _____

Explain your answer.

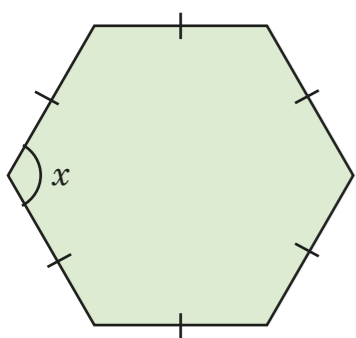**4** A polygon has n sides.

a) Write an expression in terms of n for the number of triangles inside the shape.

_____

b) Write an expression in terms of n for the sum of the interior angles of the polygon.
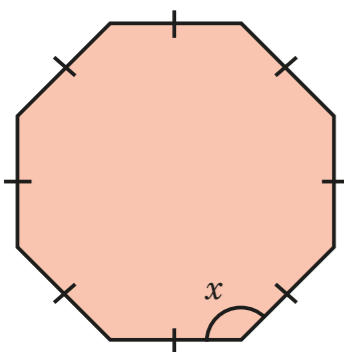
_____

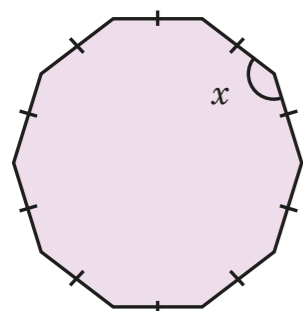**5** Work out the size of angle x in the regular polygons.

number of sides = 5

sum of interior angles = ☐

☐ ÷ 5 = ☐

x = ☐

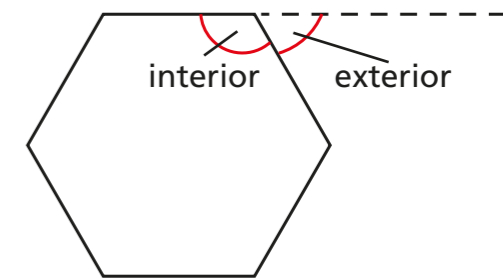number of sides = ☐

sum of interior angles = ☐

☐ ÷ ☐ = ☐

x = ☐

number of sides = ☐

sum of interior angles = ☐

☐ ÷ ☐ = ☐

x = ☐

number of sides = ☐

sum of interior angles = ☐

☐ ÷ ☐ = ☐

x = ☐

6 The diagram shows an interior angle of a regular hexagon and its adjacent exterior angle.

interior   exterior

a) What is the size of the interior angle of the hexagon? ☐

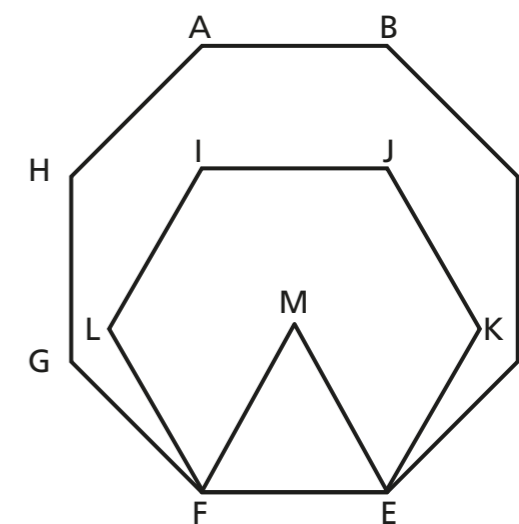b) What is the size of the exterior angle?

Give a reason for your answer.

_____

7 A regular polygon has 24 sides.

a) Work out the size of each interior angle.

☐

b) Work out the size of each exterior angle.

☐

8 The diagram is made up of regular polygons.

Work out the size of as many angles as you can.

Record your answers using correct angle notation.

A   B
H   I   J   C
    L   M   K
G   D
    F   E

Compare answers with a partner.

White Rose Maths