

Geometry: 2D Shapes & Angles: Hard Practice Paper 7 Answers

Q#	Answer	Explanation
1	C	The two angles sit on a straight line, so they add up to 180° . Together they make $2x + 8$ added to $4x - 8$, and the 8s cancel out, leaving $6x$ equal to 180. So x is $180 \div 6 = 30$.
2	D	The two equal sides make this an isosceles triangle, so the two base angles are equal. They share what is left after the 36° , which is $180 - 36 = 144$ degrees, so each one is $144 \div 2 = 72$ degrees.
3	A	The interior and exterior angles at a vertex add up to 180° . If the interior is 5 times the exterior then the two together are 6 lots of the exterior, so the exterior angle is $180 \div 6 = 30$ degrees. The number of sides is then $360 \div 30 = 12$.
4	D	The four angles fill a full turn of 360° , and together they make $x + 2x + 3x + 4x = 10x$. So x is $360 \div 10 = 36$ degrees, and the largest angle is $4x$, which is $36 \times 4 = 144$ degrees.
5	C	The two marked angles sit in matching positions at the two crossings, so they are corresponding angles and must be equal. That makes $3x$ equal to $x + 50$, and taking x from both sides leaves $2x$ equal to 50, so x is 25.
6	B	The three angles at the shared corner fill a full turn. The hexagon's interior angle is 120° and the pentagon's is 108° , which come to 228° , so the angle left between them is $360 - 228 = 132$ degrees.
7	D	The exterior angle must divide exactly into 360° . Taking each from 180° gives exterior angles of 80, 50, 35, 30 and 25 degrees, and of those only 30 divides into 360 a whole number of times, since $360 \div 30 = 12$. So 150° belongs to a regular 12-sided polygon.
8	C	The polygon splits into triangles numbering 2 fewer than its sides. Here the number of triangles is $1980 \div 180 = 11$, so the number of sides is $11 + 2 = 13$.

9	C	From each of the 8 corners a diagonal reaches the 5 corners that are not next to it, giving $8 \times 5 = 40$. Every diagonal is counted twice that way, once from each end, so the real number is $40 \div 2 = 20$.
10	C	The ratio splits the triangle's 180° into $2 + 5 + 8 = 15$ equal shares, so one share is $180 \div 15 = 12$ degrees. The smallest angle is 2 shares, which is $12 \times 2 = 24$ degrees.
11	E	Angle y sits next to the 42° angle on a straight line, so the two of them add up to 180° . That gives $y = 180 - 42 = 138$ degrees.
12	C	At 40 minutes past, the minute hand points at the 8, which is 240° round from the top. The hour hand has gone two thirds of the way from 2 to 3, so it sits at $60 + 20 = 80$ degrees. The gap between them is $240 - 80 = 160$ degrees.
13	D	A regular polygon whose rotational symmetry is order 15 must have 15 sides, since it fits onto itself once for each side as it turns. A regular polygon always has as many lines of symmetry as sides, so it has 15.
14	C	The four angles of a quadrilateral add up to 360° , and here they come to $3x + 5x + 3x + 5x = 16x$. So x is $360 \div 16 = 22.5$. That gives angles of 67.5° and 112.5° , which do add to 180° as they must in a parallelogram.
15	D	Call each of the equal angles x , so the third is $x - 42$. The three add to 180, giving $3x - 42 = 180$, so $3x$ is 222 and x is 74. The two equal angles of 74° are the largest, with the third being $74 - 42 = 32$ degrees.