

Geometry: 2D Shapes & Angles: Hard Practice Paper 8 Answers

Q#	Answer	Explanation
1	C	The three angles lie on a straight line and so add up to 180° . Taking off the 45° leaves 135 degrees for the other two, which together make $x + 15$ added to $2x$, or $3x + 15$. So $3x$ is $135 - 15 = 120$, and x is 40.
2	C	Because two sides are equal the triangle is isosceles, so the two angles at the base match each other. They share what is left after the 44° , which is $180 - 44 = 136$ degrees, so each one is $136 \div 2 = 68$ degrees.
3	D	The exterior angles of any polygon add up to 360° , and in a regular polygon they are all the same. So the number of sides is $360 \div 12 = 30$.
4	D	The four angles fill a full turn of 360° . The two known ones come to $60 + 75 = 135$, leaving $360 - 135 = 225$ degrees for x and $2x$ together, which is $3x$. So x is $225 \div 3 = 75$.
5	C	The two marked angles lie between the parallel lines but on opposite sides of the sloping line, so they are alternate angles and are equal. That makes $4x$ equal to $x + 48$, and taking x from both sides leaves $3x$ equal to 48, so x is 16.
6	C	In a shape with n sides, each corner joins by a diagonal to the $n - 3$ corners that are not itself or its neighbours, and each diagonal gets counted twice. Trying 8 sides gives $8 \times 5 = 40$, and $40 \div 2 = 20$ diagonals, which matches. Seven sides would give only 14.
7	A	Each square gives an angle of 90° and each equilateral triangle gives 60° . The squares contribute $90 \times 2 = 180$ degrees and the triangles $60 \times 3 = 180$ degrees, and $180 + 180 = 360$, which is exactly a full turn.
8	C	The polygon splits into triangles numbering 2 fewer than its sides, each holding 180° . The number of triangles is $3600 \div 180 = 20$, so the number of sides is $20 + 2 = 22$.

9	C	The angles at the centre fill one full turn of 360° , and there is one triangle for each side. So the number of sides is $360 \div 24 = 15$.
10	D	The ratio splits 360° into $1 + 3 + 5 + 9 = 18$ equal shares, so one share is $360 \div 18 = 20$ degrees. The largest angle is 9 shares, or 180° , and the smallest is 1 share, or 20° , so the difference is $180 - 20 = 160$ degrees.
11	C	At half past nine the minute hand points straight down, at 180° from the top. The hour hand has moved half way from 9 to 10, so it sits at 285° from the top. The angle between them is $285 - 180 = 105$ degrees.
12	C	At that corner the square takes 90° and the triangle takes 60° , which is 150° between them. The angle outside both shapes is the rest of the full turn, which is $360 - 150 = 210$ degrees.
13	B	The four angles of a quadrilateral add up to 360° , and here they make $2x + 4x + 2x + 4x = 12x$. So x is $360 \div 12 = 30$, giving angles of 60° and 120° .
14	D	The exterior angle is $180 - 162 = 18$ degrees, since the two sit together on a straight line. The number of sides is then $360 \div 18 = 20$.
15	E	The exterior angle at C equals angles A and B added together, so A and B come to 118° . If A is 3 times B then together they are 4 lots of B, so B is $118 \div 4 = 29.5$ degrees and A is $29.5 \times 3 = 88.5$ degrees.