Name:

Exam Style Questions

# Angles - Polygons

Corbettmaths

Equipment needed: Calculator, pen

**Guidance**

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

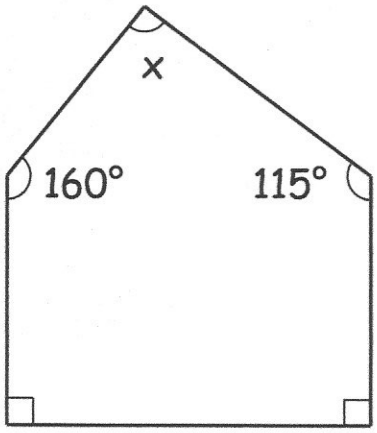
Video Tutorial

www.corbettmaths.com/contents

Video 32

Answers and Video Solutions

1.



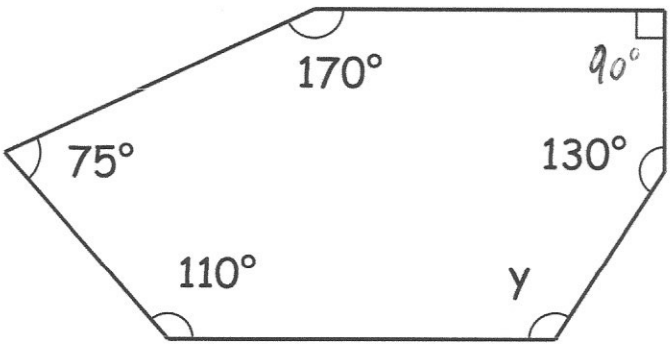

(a) Calculate the size of angle x.

160
115
90
+2 90
455

4 1 3
5 4 0
- 4 5 5
8 5

x = 85 °

**(2)**




(b) Calculate the size of angle y.

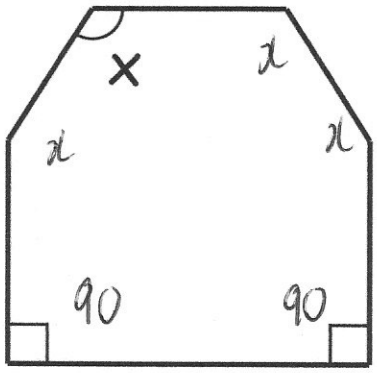
170
110
130
90
+2 75
575

6 1
7 2 0
- 5 7 5
1 4 5

y = 145 °

**(2)**

2. The hexagon below has two right angles.
The other four angles are all equal.




Work out the size of angle x.

$90 + 90 = 180$

$720 - 180 = 540$

$540 \div 4 = 135$

135 .....°

**(3)**

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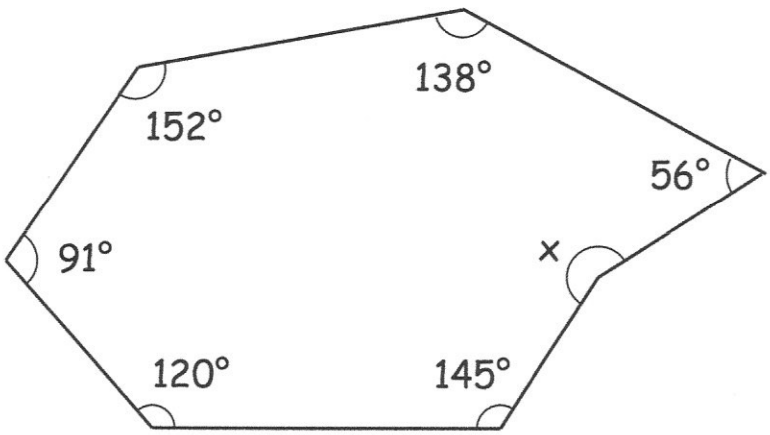
3. Shown below is a heptagon.




Calculate the size of angle x.

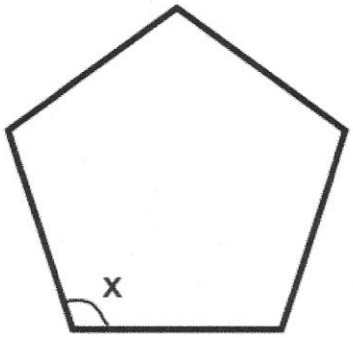
$(7-2) \times 180 = 900°$

$91 + 152 + 138 + 56 + 145 + 120 = 702$

$900 - 702 = 198$ 198 .....°

**(2)**

4. Shown below is a regular pentagon.

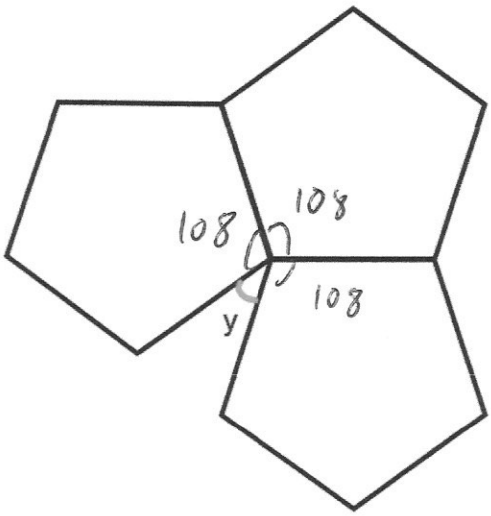



(a) Find the size of each interior angle.

$540 \div 5 = 108$

x = 108 °

**(2)**




Three identical regular pentagons are joined as shown above.

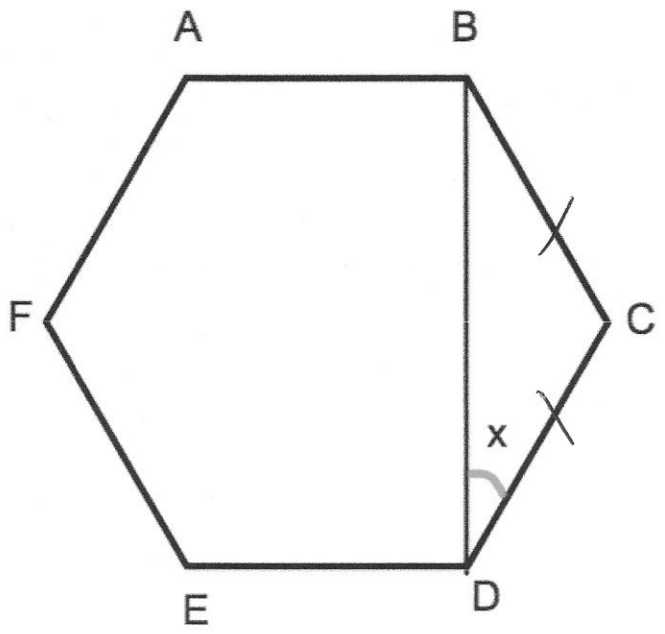
(b) Work out the size of angle y.

$$\begin{array}{r} 108 \\ 108 \\ +\ 108 \\ \hline 324 \end{array} \qquad \begin{array}{r} {}^{5}\cancel{360}^{1}0 \\ -\ 324 \\ \hline 36 \end{array}$$

y = 36 °

**(2)**

5. Shown below is a regular hexagon ABCDEF.




Calculate angle x.

720 ÷ 6 = 120

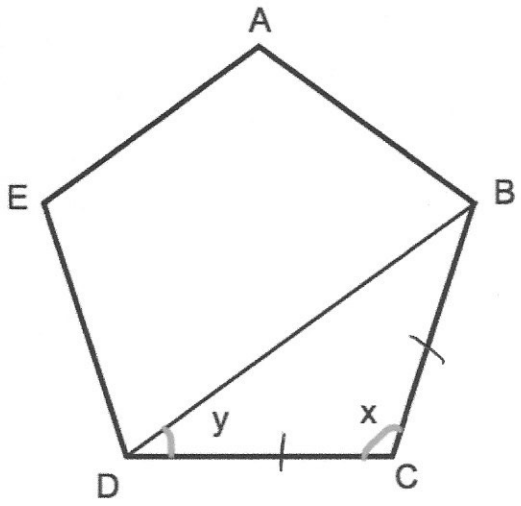
180 − 120 = 60

60 ÷ 2 = 30

x = 30 °

**(3)**

6. Shown below is a regular pentagon ABCDE.




(a) Work out angle x.

$540 \div 5 = 108$

x = 108 °

**(2)**

(b) Work out angle y.

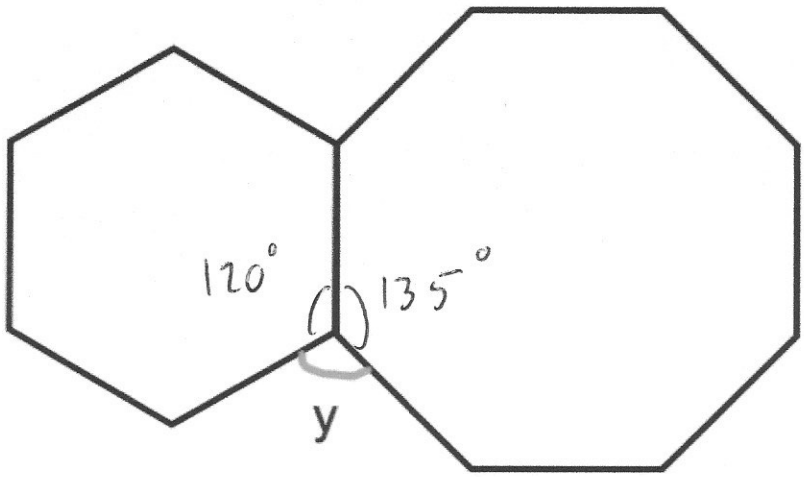
$180 - 108 = 72$

$72 \div 2 = 36$

y = 36 °

**(2)**

7. Shown is a regular hexagon and a regular octagon.




Calculate the size of angle y.

$720 \div 6 = 120°$

$1080 \div 8 = 135°$

$120 + 135 = 255$

$360 - 255 = 105$

y = 105 °

**(3)**

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8. A regular polygon has 12 sides.

Work out the size of each interior angle.

method 1

$(12-2) \times 180 = 1800$

$1800 \div 12 = 150°$

method 2

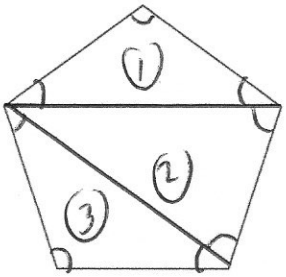
$360 \div 12 = 30°$

$180 - 30 = 150°$

150 °

**(2)**

9.

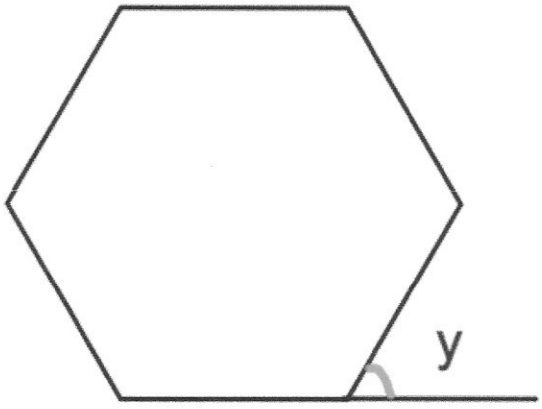



Explain why the sum of the interior angles in a regular pentagon is 540°

The sum of the angles in each triangle is 180°.
There are 3 triangles that form the pentagon,
so $3 \times 180° = 540°$

**(2)**

10. Shown below is a regular hexagon, with an exterior angle labeled y.




Work out the size of each exterior angle.

$360 \div 6 = 60°$

y = 60 °

**(2)**

11. A regular polygon has 24 sides.

Work out the size of each exterior angle.

$360 \div 24 = 15^\circ$

15 °

**(2)**

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12. Each exterior angle of a regular polygon is 20°

Work out the number of sides of the polygon.

$360 \div 20 = 18$

18 sides

**(2)**

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13. Each interior angle of a regular polygon is 174°

Work out the number of sides of the polygon.

$180 - 174 = 6$

$360 \div 6 = 60$

60 sides

**(2)**

14. The interior angle of a regular polygon is 135°

Work out the number of sides of the polygon.

$180 - 135 = 45$

$360 \div 45 = 8$

8 sides

**(2)**

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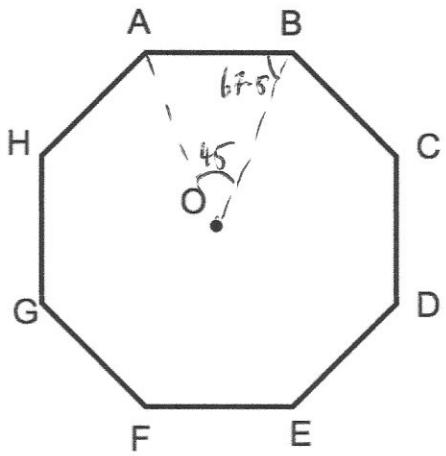
15. ABCDEFGH is a regular octagon.




(a) Calculate the size of angle AOB.

$360 \div 8 = 45$

45 °

**(2)**

(b) Calculate the size of angle ABC.

$1080 \div 8 = 135$

135 °

**(2)**

OR

$180 - 45 = 135$

$135 \div 2 = 67.5°$

$67.5 \times 2 = 135$

16. Martin has drawn a regular nonagon (9 sided polygon).

(a) What size is each exterior angle?

$360 \div 9 = 40°$

40 .....°

**(2)**

(b) What size is each interior angle?

$180 - 40 = 140$

140 .....°

**(2)**

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17. Shown below is an interior angle from a regular polygon.


Calculate the number of sides the polygon has.

$360 \div 5 = 72$

72 sides

**(2)**

18. Isaac wants to work out the size of each exterior angle of a regular 12 sided polygon.

Here is Isaac's working out.

(12 - 2) x 180 = 1800°

1800 ÷ 12 = 150°

360 - 150 = 210°

Answer: 210°

Explain Isaac's mistake.

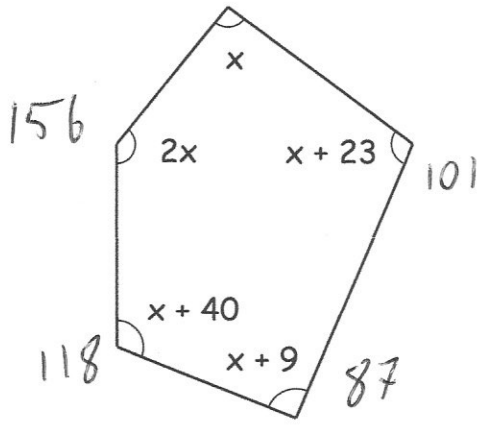
Interior + exterior = 180°

Isaac has taken the interior angle (150°) away from 360, instead he should use 180°.

**(2)**

19. The diagram shows a pentagon.

78




sum of angles = 540°

Work out the size of the largest angle in the pentagon.

$x + 2x + (x+23) + (x+9) + (x+40) = 540$

$6x + 72 = 540$

$6x = 468$

$x = 78$

$2x = 156°$

156

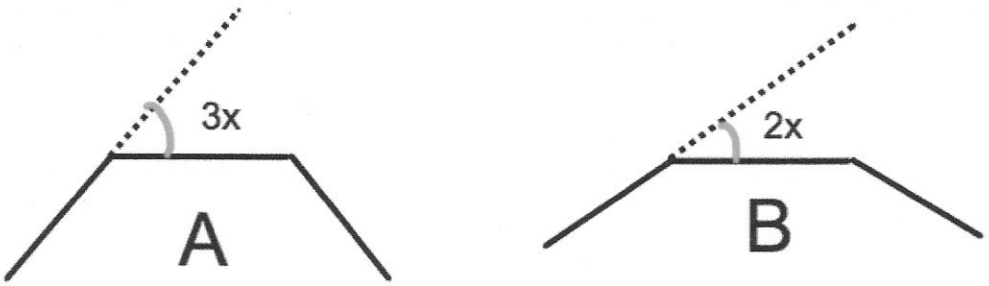
.....°

**(5)**

20. The diagram shows parts of two regular polygons A and B.

A has 10 sides and exterior angle 3x.
B has exterior angle 2x.

Not to scale




Work out the number of sides regular polygon B has.

$360 \div 10 = 36°$

$3x = 36$

$x = 12$

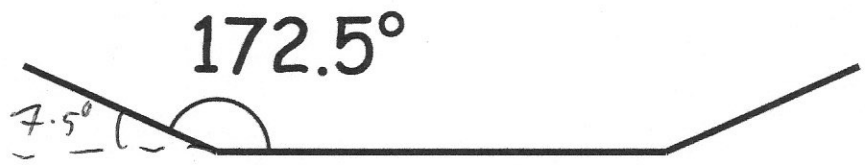
$2x = 24$

$360 \div 24 = 15$

15 sides

**(5)**

21. The diagram below shows part of a regular polygon.




(a) Calculate the size of each exterior angle.

7.5 °

**(1)**

(b) Calculate the number of sides the polygon has.

$360 \div 7.5 = 48$

48 sides

**(2)**

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22. Explain why a regular octagon will **not** tessellate.

$(8-2) \times 180 = 1080$

$1080 \div 8 = 135°$

360 is not divisible by 135°

Two octagons will join at a point to make an angle of 270°.
A third octagon would not fit. (a square would!)

**(3)**

23. Work out the sum of the interior angles for a 40 sided polygon.

$(40-2) \times 180 = 6840$

6840 °

**(2)**

24. The sum of the interior angles in a polygon is 7380°

Calculate the number of sides the polygon has.

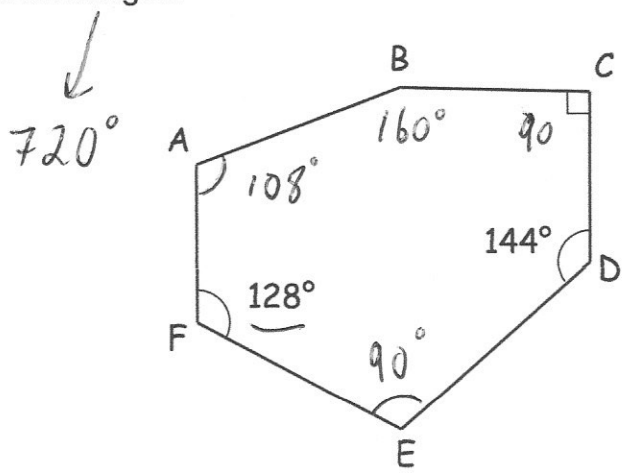
$7380 \div 180 = 41$

$41 + 2 = 43$

43 sides

**(2)**

25. ABCDEF is a hexagon.




720°

160
90
144
+ 128
522

Angle BAF : Angle DEF = 6 : 5

Angle AFE : Angle ABC = 4 : 5

$128 \div 4 = 32$

$32 \times 5 = 160°$

$720 - 522 = 198°$

$6 + 5 = 11$

$198 \div 11 = 18$

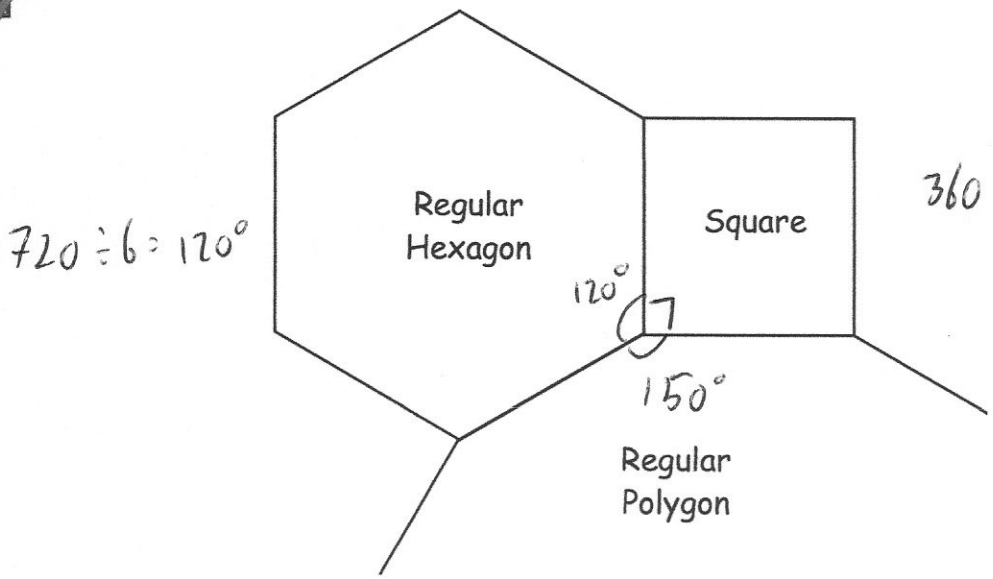
$6 \times 18 = 108°$

$5 \times 18 = 90°$

$\angle ABC = 160°$ $\angle BAF = 108°$ $\angle DEF = 90°$

**(5)**

26. Shown below is part of a regular polygon, a regular hexagon and a square.




Work out how many sides the regular polygon has.

120 + 90 = 210

360 − 210 = 150

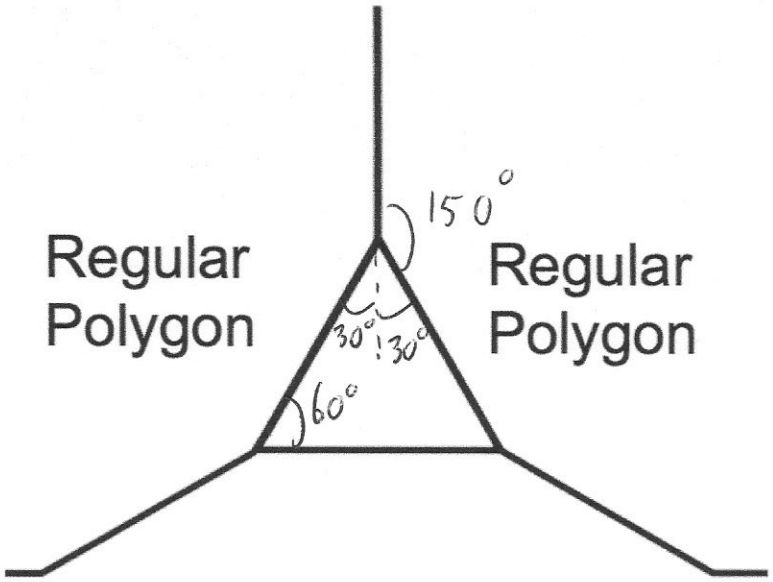
180 − 150 = 30

360 ÷ 30 = 12

12 sides

**(4)**

27. Shown below are two identical regular polygons and an equilateral triangle.




Calculate the number of sides each regular polygon has.

$180 \div 3 = 60°$

$60° \div 2 = 30°$

$360 \div 30 = 12$

12 sides

.....

**(3)**

28. A regular polygon has interior angles that are 5 times larger than each of its exterior angles.

Calculate how many sides it has.

interior + exterior = 180°

$5x + x = 180$

$6x = 180$

$x = 30$

$360 \div 30 = 12$

12 sides

.....

**(4)**