

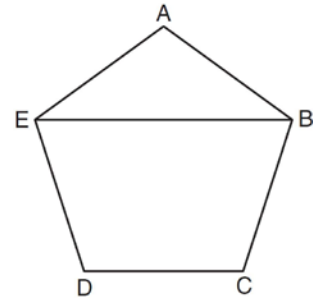
**G.CO.C.11: Interior and Exterior Angles of Polygons 2a**

- 1 Which type of figure is shown in the accompanying diagram?

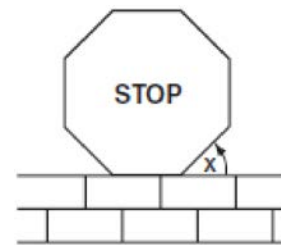


- 1) hexagon
  - 2) octagon
  - 3) pentagon
  - 4) quadrilateral
- 2 What is the measure of each interior angle of a regular hexagon?
- 1)  $60^\circ$
  - 2)  $120^\circ$
  - 3)  $135^\circ$
  - 4)  $270^\circ$
- 3 Determine, in degrees, the measure of each interior angle of a regular octagon.
- 4 Determine and state the measure, in degrees, of an interior angle of a regular decagon.

- 5 In the diagram below of regular pentagon  $ABCDE$ ,  $\overline{EB}$  is drawn.

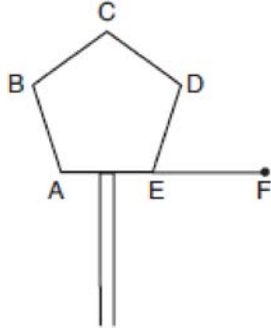


- What is the measure of  $\angle AEB$ ?
- 1)  $36^\circ$
  - 2)  $54^\circ$
  - 3)  $72^\circ$
  - 4)  $108^\circ$
- 6 What is the measure, in degrees, of each exterior angle of a regular hexagon?
- 1) 45
  - 2) 60
  - 3) 120
  - 4) 135
- 7 A stop sign in the shape of a regular octagon is resting on a brick wall, as shown in the accompanying diagram.



- What is the measure of angle  $x$ ?
- 1)  $45^\circ$
  - 2)  $60^\circ$
  - 3)  $120^\circ$
  - 4)  $135^\circ$

- 8 One piece of the birdhouse that Natalie is building is shaped like a regular pentagon, as shown in the accompanying diagram.

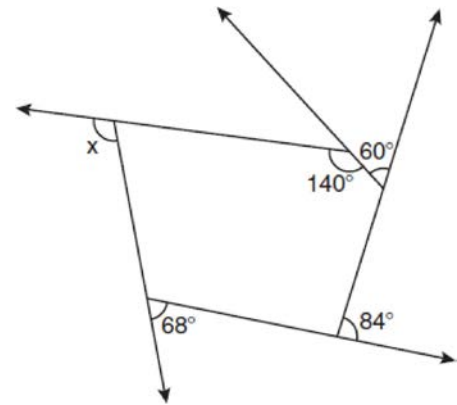


If side  $AE$  is extended to point  $F$ , what is the measure of exterior angle  $DEF$ ?

- 1)  $36^\circ$
  - 2)  $72^\circ$
  - 3)  $108^\circ$
  - 4)  $144^\circ$
- 9 What is the difference between the sum of the measures of the interior angles of a regular pentagon and the sum of the measures of the exterior angles of a regular pentagon?
- 1) 36
  - 2) 72
  - 3) 108
  - 4) 180
- 10 Find, in degrees, the measures of both an interior angle and an exterior angle of a regular pentagon.
- 11 The sum of the interior angles of a regular polygon is  $720^\circ$ . How many sides does the polygon have?
- 1) 8
  - 2) 6
  - 3) 5
  - 4) 4
- 12 The measure of an interior angle of a regular polygon is  $120^\circ$ . How many sides does the polygon have?
- 1) 5
  - 2) 6
  - 3) 3
  - 4) 4
- 13 Melissa is walking around the outside of a building that is in the shape of a regular polygon. She determines that the measure of one exterior angle of the building is  $60^\circ$ . How many sides does the building have?
- 1) 6
  - 2) 9
  - 3) 3
  - 4) 12
- 14 A regular polygon has an exterior angle that measures  $45^\circ$ . How many sides does the polygon have?
- 1) 10
  - 2) 8
  - 3) 6
  - 4) 4
- 15 A regular polygon with an exterior angle of  $40^\circ$  is a
- 1) pentagon
  - 2) hexagon
  - 3) nonagon
  - 4) decagon
- 16 What is the measure of the largest exterior angle that any regular polygon can have?
- 1)  $60^\circ$
  - 2)  $90^\circ$
  - 3)  $120^\circ$
  - 4)  $360^\circ$
- 17 The sum of the interior angles of a regular polygon is  $540^\circ$ . Determine and state the number of degrees in one interior angle of the polygon.

- 18 The sum of the interior angles of a polygon of  $n$  sides is
- 1) 360
  - 2)  $\frac{360}{n}$
  - 3)  $(n - 2) \cdot 180$
  - 4)  $\frac{(n - 2) \cdot 180}{n}$
- 19 The sum of the measures of the interior angles of an octagon is
- 1)  $180^\circ$
  - 2)  $360^\circ$
  - 3)  $540^\circ$
  - 4)  $1,080^\circ$
- 20 What is the sum, in degrees, of the measures of the interior angles of a pentagon?
- 1) 180
  - 2) 360
  - 3) 540
  - 4) 900
- 21 The number of degrees in the sum of the interior angles of a pentagon is
- 1) 72
  - 2) 360
  - 3) 540
  - 4) 720
- 22 In which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?
- 1) triangle
  - 2) hexagon
  - 3) octagon
  - 4) quadrilateral
- 23 For which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?
- 1) hexagon
  - 2) pentagon
  - 3) quadrilateral
  - 4) triangle

- 24 The pentagon in the diagram below is formed by five rays.



- What is the degree measure of angle  $x$ ?
- 1) 72
  - 2) 96
  - 3) 108
  - 4) 112
- 25 The measures of five of the interior angles of a hexagon are  $150^\circ$ ,  $100^\circ$ ,  $80^\circ$ ,  $165^\circ$ , and  $150^\circ$ . What is the measure of the sixth interior angle?
- 1)  $75^\circ$
  - 2)  $80^\circ$
  - 3)  $105^\circ$
  - 4)  $180^\circ$
- 26 If the sum of the interior angles of a polygon is  $1440^\circ$ , then the polygon must be
- 1) an octagon
  - 2) a decagon
  - 3) a hexagon
  - 4) a nonagon

## G.CO.C.11: Interior and Exterior Angles of Polygons 2a

### Answer Section

1 ANS: 1 REF: 060802a

2 ANS: 2

$$(n-2)180 = (6-2)180 = 720. \quad \frac{720}{6} = 120.$$

REF: 081125ge

3 ANS:

$$(n-2)180 = (8-2)180 = 1080. \quad \frac{1080}{8} = 135.$$

REF: 061330ge

4 ANS:

$$\frac{(n-2)180}{n} = \frac{(10-2)180}{10} = 144$$

REF: 011531ge

5 ANS: 1

$$\angle A = \frac{(n-2)180}{n} = \frac{(5-2)180}{5} = 108 \quad \angle AEB = \frac{180-108}{2} = 36$$

REF: 081022ge

6 ANS: 2

$$(n-2)180 = (6-2)180 = 720. \quad \frac{720}{6} = 120. \quad 180 - 120 = 60.$$

REF: 060213a

7 ANS: 1

$$(n-2)180 = (8-2)180 = 1080. \quad \frac{1080}{8} = 135. \quad 180 - 45 = 135.$$

REF: 080507a

8 ANS: 2

$$(n-2)180 = (5-2)180 = 540. \quad \frac{540}{5} = 108. \quad 180 - 108 = 72.$$

REF: 060718a

9 ANS: 4

$$(n-2)180 - n \left( \frac{(n-2)180}{n} \right) = 180n - 360 - 180n + 180n - 360 = 180n - 720.$$

$$180(5) - 720 = 180$$

REF: 081322ge

10 ANS:

$$(5-2)180 = 540. \frac{540}{5} = 108 \text{ interior. } 180 - 108 = 72 \text{ exterior}$$

REF: 011131ge

11 ANS: 2

$$180(n-2) = 720$$

$$n-2 = 4$$

$$n = 6$$

REF: 061521ge

12 ANS: 2

$$\frac{(n-2)180}{n} = 120 .$$

$$180n - 360 = 120n$$

$$60n = 360$$

$$n = 6$$

REF: 011326ge

13 ANS: 1

Find an interior angle.  $180 - x = 60$  . Find  $n$ .  $\frac{(n-2)180}{n} = 120$  .

$$x = 120$$

$$180n - 360 = 120n$$

$$60n = 360$$

$$n = 6$$

REF: 060423a

14 ANS: 2

$$180 - \frac{(n-2)180}{n} = 45$$

$$180n - 180n + 360 = 45n$$

$$360 = 45n$$

$$n = 8$$

REF: 061413ge

15 ANS: 3

$$180 - \frac{(n-2)180}{n} = 40$$

$$180n - 180n + 360 = 40n$$

$$360 = 40n$$

$$n = 9$$

REF: 061519ge

16 ANS: 3

The regular polygon with the smallest interior angle is an equilateral triangle, with  $60^\circ$ .  $180^\circ - 60^\circ = 120^\circ$

REF: 011417ge

17 ANS:

$$(n-2)180 = 540. \quad \frac{540}{5} = 108$$

$$n - 2 = 3$$

$$n = 5$$

REF: 081434ge

18 ANS: 3

REF: 061218ge

19 ANS: 4

$$(n-2)180 = (8-2)180 = 1080$$

REF: 080109a

20 ANS: 3

$$(n-2)180 = (5-2)180 = 540$$

REF: 010514a

21 ANS: 3

$$(n-2)180 = (5-2)180 = 540$$

REF: 011223ge

22 ANS: 4

sum of interior  $\angle$ s = sum of exterior  $\angle$ s

$$(n-2)180 = n \left( 180 - \frac{(n-2)180}{n} \right)$$

$$180n - 360 = 180n - 180n + 360$$

$$180n = 720$$

$$n = 4$$

REF: 081016ge

23 ANS: 3

$$180(n-2) = n \left( 180 - \frac{180(n-2)}{n} \right)$$

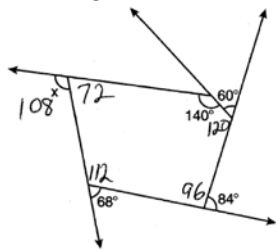
$$180n - 360 = 180n - 180n + 360$$

$$180n = 720$$

$$n = 4$$

REF: 081223ge

24 ANS: 3

. The sum of the interior angles of a pentagon is  $(5-2)180 = 540$ .

REF: 011023ge

25 ANS: 1

$$(n-2)180 = (6-2)180 = 720$$

$$720 - (150 + 100 + 80 + 165 + 150) = 75$$

REF: 080820a

26 ANS: 2

$$(n-2)180 = 1440$$

$$n-2 = 8$$

$$n = 10$$

REF: 011618ge