18. $x = 5.8$; Use the Law of Sines with the 57° angle and the side of length 13 since they are opposite each other to find the length of the side, x, which is opposite the 22° angle.

$$\frac{\sin 57^\circ}{13} = \frac{\sin 22^\circ}{x}$$
$$x \cdot \frac{\sin 57^\circ}{13} = \sin 22^\circ$$
$$x = \frac{13}{\sin 57^\circ} \cdot \sin 22^\circ$$
$$x \approx 5.8$$

19. $x = 43.7$; Use the Law of Sines with the 34° angle and the side of length 26 as they are opposite each other to find the length of the side, x, which is opposite the 70° angle.

$$\frac{\sin 34^\circ}{26} = \frac{\sin 70^\circ}{x}$$
$$x \cdot \frac{\sin 34^\circ}{26} = \sin 70^\circ$$
$$x = \frac{26}{\sin 34^\circ} \cdot \sin 70^\circ$$
$$x \approx 43.7$$

20. $x = 4.3$; The angles of a triangle sum to 180° so the missing angle is 23° since $180 - 125 - 32 = 23$. Use the Law of Sines to write an equation and solve for x, which is opposite the 23° angle.

$$\frac{\sin 125^\circ}{9} = \frac{\sin 23^\circ}{x}$$
$$x \cdot \frac{\sin 125^\circ}{9} = \sin 23^\circ$$
$$x = \frac{9}{\sin 125^\circ} \cdot \sin 23^\circ$$
$$x \approx 4.3$$

21. $x = 17.3$; The angles of a triangle sum to 180° so the missing angle is 83° since $180 - 66 - 31 = 83$. Use the Law of Sines to write an equation and solve for x, which is opposite the 83° angle.

$$\frac{\sin 31^\circ}{9} = \frac{\sin 83^\circ}{x}$$
$$x \cdot \frac{\sin 31^\circ}{9} = \sin 83^\circ$$
$$x = \frac{9}{\sin 31^\circ} \cdot \sin 83^\circ$$
$$x \approx 17.3$$

22. $x = 12.4$; The angles of a triangle sum to 180° so the missing angle is 33° since $180 - 113 - 34 = 33$. Use the Law of Sines to write an equation and solve for x, which is opposite the 33° angle.

$$\frac{\sin 113^\circ}{21} = \frac{\sin 33^\circ}{x}$$
$$x \cdot \frac{\sin 113^\circ}{21} = \sin 33^\circ$$
$$x = \frac{21}{\sin 113^\circ} \cdot \sin 33^\circ$$
$$x \approx 12.4$$

23. $x = 15.8$; The angles of a triangle sum to 180° so the missing angle is 43° since $180 - 59 - 78 = 43$. Use the Law of Sines to write an equation and solve for x, which is opposite the 78° angle.

$$\frac{\sin 43^\circ}{11} = \frac{\sin 78^\circ}{x}$$
$$x \cdot \frac{\sin 43^\circ}{11} = \sin 78^\circ$$
$$x = \frac{11}{\sin 43^\circ} \cdot \sin 78^\circ$$
$$x \approx 15.8$$

24. $x^\circ = 42.4^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 68^\circ}{22} = \frac{\sin x^\circ}{16}$$
$$16 \cdot \frac{\sin 68^\circ}{22} = \sin x^\circ$$
$$\sin^{-1}\left(16 \cdot \frac{\sin 68^\circ}{22}\right) = x^\circ$$
$$42.4^\circ \approx x^\circ$$

25. $x^\circ = 18.3^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 122^\circ}{27} = \frac{\sin x^\circ}{10}$$
$$10 \cdot \frac{\sin 122^\circ}{27} = \sin x^\circ$$
$$\sin^{-1}\left(10 \cdot \frac{\sin 122^\circ}{27}\right) = x^\circ$$
$$18.3^\circ \approx x^\circ$$

26. $x^\circ = 57.0^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 34^\circ}{6} = \frac{\sin x^\circ}{9}$$
$$9 \cdot \frac{\sin 34^\circ}{6} = \sin x^\circ$$
$$\sin^{-1}\left(9 \cdot \frac{\sin 34^\circ}{6}\right) = x^\circ$$
$$57.0^\circ \approx x^\circ$$

27. $x^\circ = 36.2^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 20^\circ}{11} = \frac{\sin x^\circ}{19}$$
$$19 \cdot \frac{\sin 20^\circ}{11} = \sin x^\circ$$
$$\sin^{-1}\left(19 \cdot \frac{\sin 20^\circ}{11}\right) = x^\circ$$
$$36.2^\circ \approx x^\circ$$

28. $x^\circ = 34.0^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 102^\circ}{14} = \frac{\sin x^\circ}{8}$$
$$8 \cdot \frac{\sin 102^\circ}{14} = \sin x^\circ$$
$$\sin^{-1}\left(8 \cdot \frac{\sin 102^\circ}{14}\right) = x^\circ$$
$$34.0^\circ \approx x^\circ$$

29. $x^\circ = 74.6^\circ$; Use the Law of Sines to write an equation and solve for x°.

$$\frac{\sin 45^\circ}{11} = \frac{\sin x^\circ}{15}$$
$$15 \cdot \frac{\sin 45^\circ}{11} = \sin x^\circ$$
$$\sin^{-1}\left(15 \cdot \frac{\sin 45^\circ}{11}\right) = x$$
$$74.6^\circ \approx x$$

30. $P = 70.6$; the angles of a triangle sum to 180° so the missing angle is 70° since $180 - 45 - 65 = 70$. Use the Law of Sines to solve for the missing side length x, opposite of the 45° angle.

$$\frac{\sin 70^\circ}{26} = \frac{\sin 45^\circ}{x}$$
$$x \cdot \frac{\sin 70^\circ}{26} = \sin 45^\circ$$
$$x = \frac{26}{\sin 70^\circ}(\sin 45^\circ)$$
$$x \approx 19.56$$

Use the Law of Sines to solve for the missing side length y, opposite of the 65° angle.

$$\frac{\sin 70^\circ}{26} = \frac{\sin 65^\circ}{y}$$
$$y \cdot \frac{\sin 70^\circ}{26} = \sin 65^\circ$$
$$y = \frac{26}{\sin 70^\circ}(\sin 65^\circ)$$
$$y \approx 25.08$$

Find the perimeter by taking the sum of the exterior edges.

$$P = 26 + x + y$$
$$= 26 + 19.56 + 25.08$$
$$= 70.6$$

31. $P = 50.1$; the angles of a triangle sum to 180° so the missing angle is 70° since $180 - 72 - 38 = 70$. Use the Law of Sines to solve for the missing side length x, opposite of the 38° angle.

$$\begin{aligned}
&\frac{\sin 72^\circ}{19} = \frac{\sin 38^\circ}{x} \\
&x \cdot \frac{\sin 72^\circ}{19} = \sin 38^\circ \\
&x = \frac{19}{\sin 72^\circ}(\sin 38^\circ) \\
&x \approx 12.30
\end{aligned}$$

Use the Law of Sines to solve for the missing side length y, opposite of the 70° angle.

$$\begin{aligned}
&\frac{\sin 72^\circ}{19} = \frac{\sin 70^\circ}{y} \\
&y \cdot \frac{\sin 72^\circ}{19} = \sin 70^\circ \\
&y = \frac{19}{\sin 72^\circ}(\sin 70^\circ) \\
&y \approx 18.77
\end{aligned}$$

Find the perimeter by taking the sum of the exterior edges.

$$\begin{aligned}
P &= 19 + x + y \\
&= 19 + 12.30 + 18.77 \\
&= 50.1
\end{aligned}$$

32. $P = 26.8$; the angles of a triangle sum to 180°, and the angles of an isosceles opposite the congruent sides are congruent by definition so the missing angles are 36° since $\frac{180-102}{2} = 36$. Use the Law of Sines to solve for the missing side length x, opposite of the 36° angles.

$$\begin{aligned}
&\frac{\sin 108^\circ}{12} = \frac{\sin 36^\circ}{x} \\
&x \cdot \frac{\sin 108^\circ}{12} = \sin 36^\circ \\
&x = \frac{12}{\sin 108^\circ}(\sin 36^\circ) \\
&x \approx 7.4
\end{aligned}$$

Find the perimeter by taking the sum of the exterior edges.

$$\begin{aligned}
P &= 19 + x + x \\
&= 19 + 7.4 + 7.4 \\
&= 26.8
\end{aligned}$$

33. $P = 115.4$; the angles of a triangle sum to 180° so the missing angle is 66° since $180 - 66 - 48 = 66$. Since two of the angles are equal the triangle is isosceles, and, by definition of an isosceles, the sides opposite the congruent angles are congruent. Therefore, the two sides opposite the 66° angle have lengths of 41. Use the Law of Sines to solve for the missing side length x, opposite of the 48° angle.

$$\frac{\sin 66^\circ}{41} = \frac{\sin 48^\circ}{x}$$
$$x \cdot \frac{\sin 66^\circ}{41} = \sin 48^\circ$$
$$x = \frac{41}{\sin 66^\circ}(\sin 48^\circ)$$
$$x \approx 33.35$$

The perimeter is the sum of the exterior edges.

$$P = 2(41) + x$$
$$= 82 + 33.4$$
$$= 115.4$$