The figure shows the result of a geometric construction.

The construction creates congruent triangles. \( \triangle ABD \cong \triangle ACD \) (not shown). Which statement provides evidence that \( AD \) is the angle bisector of \( \angle BAC \)?

A \( \angle ACD \cong \angle ABD \)
B \( \angle BAC \cong \angle BDC \)
C \( \angle BAD \cong \angle CAD \)
D \( \angle BAD \cong \angle ABD \)
Day 25

36 A steel pipe in the shape of a right circular cylinder is used for drainage under a road. The length of the pipe is 12 ft and its diameter is 36 inches. The pipe is open at both ends.

How many square feet of steel is the outer surface of the pipe?

Enter your answer into the box provided. Round to the nearest integer.

Skip

Surface Area not an FSA standard
Day 26

37 A steel pipe in the shape of a right circular cylinder is used for drainage under a road. The length of the pipe is 12 ft and its diameter is 36 inches. The pipe is open at both ends.

A wire screen in the shape of a square is attached at one end of the pipe to allow water to flow through, to keep animals from getting inside the pipe. The length of the diagonals of the screen are equal to the diameter of the pipe. The figure represents the placement of the screen at the end of the pipe.

What are the area and perimeter of the screen? Enter your answers into the given boxes. Round your answers to the nearest whole number.

\[ A = \left(18\sqrt{2}\right)^2 \]

\[ P = 4 \left(18\sqrt{2}\right) \approx 102 \]
An unmanned aerial vehicle (UAV) is equipped with cameras used to monitor forest fires. The figure represents a moment in time at which a UAV, at point B, flying at an altitude of 1,000 meters (m) is directly above point D on the forest floor. Point A represents the location of a small fire on the forest floor.

At the moment in time represented by the figure, the angle of depression from the UAV to the fire has a measure of 30°.

At the moment in time represented by the figure, what is the distance from the UAV to the fire? Enter your answer into the box.

2000
An unmanned aerial vehicle (UAV) is equipped with cameras used to monitor forest fires. The figure represents a moment in time at which a UAV, at point B, flying at an altitude of 1,000 meters (m) is directly above point D on the forest floor. Point A represents the location of a small fire on the forest floor.

At the moment in time represented by the figure, the angle of depression from the UAV to the fire has a measure of $30^\circ$.

What is the distance, to the nearest meter, from the fire to point D?

Enter your answer in the box.

1732
A spring is attached at one end to support $B$ and at the other end to collar $A$, as represented in the figure. Collar $A$ slides along the vertical bar between points $C$ and $D$. In the figure, the angle $\theta$ is the angle created as the collar moves between points $C$ and $D$.

When $\theta = 28^\circ$, what is the distance from point $A$ to point $B$ to the nearest tenth of a foot. Enter a number into the box.

\[
\cos 28 = \frac{3}{x}
\]

\[
3 = x(\cos 28)
\]

\[
x = \frac{3}{\cos 28}
\]
Day 30

41. A spring is attached at one end to support B and at the other end to collar A, as represented in the figure. Collar A slides along the vertical bar between points C and D. In the figure, the angle $\theta$ is the angle created as the collar moves between points C and D.

When the spring is stretched and the distance from point A and point B is 5.2 feet, what is the value of $\theta$ to the nearest tenth of a degree.

- 35.2°
- 45.1°
- 54.8°
- 60.0°

\[ \theta = \cos^{-1} \left( \frac{3}{5.2} \right) \]

\[ \theta = 54.8 \]
The figure shows line $r$, points $P$ and $T$ on line $r$, and point $Q$ not on line $r$. Also shown is ray $PQ$.

Consider the partial construction of a line parallel to $r$ through point $Q$. What would be the final step in the construction?

- A draw a line through $P$ and $S$
- B draw a line through $Q$ and $S$
- C draw a line through $T$ and $S$
- D draw a line through $W$ and $S$
The figure shows line \( r \), points \( P \) and \( T \) on line \( r \), and point \( Q \) not on line \( r \). Also shown is ray \( PQ \).

Consider the partial construction of a line parallel to \( r \) through point \( Q \). What would be the final step in the construction?

Which of the reasons listed contribute to proving the validity of the construction.

- When two lines are cut by a transversal and the corresponding angles are congruent, the lines are parallel.
- When two lines are cut by a transversal and the vertical angles are congruent, the lines are parallel.
- Definition of segment bisector.
- Definition of angle bisector.
Day 33

Luke purchased a warehouse on a plot of land for his business. The figure represents a plan of the land showing the location of the warehouse and parking area. The coordinates represent points on a rectangular grid with units in feet.

Enter your answers to each part in the boxes.

Part A

What is the perimeter of the plot of land rounded to the nearest tenth of a foot?

\[ 243.2 \]

Part B

What is the area of the plot of land that does not include the warehouse and the parking area?

\[ 1740 \]

Part C

Luke is planning to put a fence along two interior sides of the parking area. The sides are represented in the plan by the legs of the trapezoid. What is the total length of fence needed to the nearest tenth of a foot?

\[ 42.8 \]
Which of the following statements can be concluded from the given triangle?

Select all correct answers.

- $m\angle U = m\angle T$
- $US = UT$
- $US = ST$
- $m\angle U = m\angle S$
- $\triangle STU$ is an isosceles triangle.
- $m\angle T = m\angle S$
- $ST = UT$
- $\triangle STU$ is an equilateral triangle
In the figure, \( \angle A \equiv \angle X \) and \( \angle C \equiv \angle Z \). Find a sequence of similarity transformations that maps \( \triangle ABC \) onto \( \triangle XYZ \).

\[
\begin{align*}
AB &= \sqrt{10} \\
XY &= \sqrt{360 + 4} \\
&= \sqrt{364} \\
&= 2\sqrt{91}
\end{align*}
\]

Enter your answer in the box.

Dilation with scale factor \( Z \) (center at origin), Reflection in \( x \)-axis, Translate left 5, up 1.
Find the scale factor of the dilation with center $A$ that maps $AB$ onto $AB'$. Explain why that scale factor could be used to map circle $A$ onto circle $A'$.

Enter your answer into the box.

Scale factor $= \frac{4}{3}$
Radius $OA' = 4$; Radius $OA = 3$
$SF = \frac{Image}{Pre-image}$
Day 37

Consider the diagram below.

Part A
Find the area of each of the five sectors in the circle. Use 3.14 for \( \pi \) and round your answer to the nearest hundredth. Enter your answers into the box.

- Sector AOB = 6.28
- Sector BOC = 12.52
- Sector COD = 8.37
- Sector DOE = 4.88
- Sector AOE = 18.14

Part B
Check your work by finding the sum of the five sector areas and comparing it to the area of the circle. Enter your response into the box.

\[
\frac{50.23}{16\pi} = 3.14 \\
50.23 = 50.24 \checkmark
\]
Describe two methods to prove that \( \triangle ABC \) is a right triangle. Enter your answer into the box.

1. **Pythagorean Converse**
   
   Is \( a^2 + b^2 = c^2 \) (\( BC \Rightarrow \text{hypotenuse} \))

2. **Compare slope of \( AB \) & \( AC \). For right \( \triangle \)
   
   the slopes must be opposite reciprocals.
Day 39

50. A concrete cylinder has the dimensions shown and a mass of 14,500 kg. To the nearest kilogram per cubic meter, what is the density of the concrete in the cylinder?

\[ V = \pi (2)^2 (2) \]

\[ V = 2\pi \]

\[ Kg \]

\[ m^3 \]

\[ 14,500 \text{ kg} \approx 2308 \]

\[ \frac{14,500 \text{ kg}}{2\pi \text{ m}^3} \]

\[ 2308 \]

\[ \circ \ 577 \text{ kg/m}^3 \]

\[ \circ \ 2308 \text{ kg/m}^3 \]

\[ \circ \ 4615 \text{ kg/m}^3 \]

\[ \circ \ 14,500 \text{ kg/m}^3 \]

51. A water tank holds 15 L of water. Which of the following solids describe a container that could be completely filled from the water tank and leave less than .5 L of water in the tank? Recall that 1 L is 1000 cm³.

\[ V = \frac{\pi (2)^2 (2)}{3} = 17.67 \]

\[ V = 15^2 \pi (2) = 14,184.4 \]

\[ V = 22 (30) (22) = 14,520 \]

\[ \circ \ 10 \]

\[ \circ \ 50 \]

\[ \circ \ 30 \]

\[ \circ \ 16 \]
52

Triangle \( \triangle ABC \) is graphed in the \( xy \)-coordinate plane with vertices \( A(1, 1) \), \( B(3, 4) \), and \( C(-1, 8) \) as shown in the figure.

If triangle \( \triangle ABC \) is reflected across the line \( y=1 \) to form \( \triangle A'B'C' \), what is the coordinate of \( B' \)?

\[
B' = \left( \frac{3}{2}, -2 \right)
\]
One method that can be used to prove that the diagonals of a parallelogram bisect each other is shown in the given partial proof.

![Parallelogram Diagram](image)

**Given:** Quadrilateral PQRS is a parallelogram  
**Prove:**  
PT = RT  
ST = QT

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quadrilateral PQRS is a parallelogram</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. (PQ \parallel SR) (PS \parallel QR)</td>
<td>2. Definition of parallelogram</td>
</tr>
<tr>
<td>3. (\angle PQS \cong \angle RSQ) (\angle QPR \cong \angle SRP)</td>
<td>3. (\text{Ref. \Delta \cong})</td>
</tr>
<tr>
<td>4. (PQ \cong SR); (PS \cong QR)</td>
<td>4. Opposite sides of a parallelogram are congruent</td>
</tr>
<tr>
<td>5. (\Delta SRT \cong \Delta QPT)</td>
<td>5. (\text{ASA})</td>
</tr>
<tr>
<td>6. (\overline{PT} \parallel \overline{RT}) (\overline{ST} \parallel \overline{QT})</td>
<td>6. Corresponding parts of congruent triangles are congruent.</td>
</tr>
<tr>
<td>7. (PQ = RT) (ST = QT)</td>
<td>7. Definition of congruent line segments</td>
</tr>
</tbody>
</table>

Enter the statement and reasons into the boxes to complete the proof.