

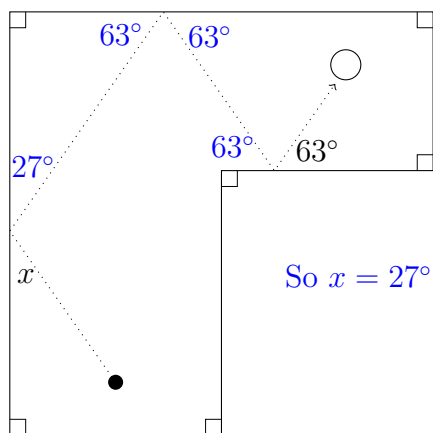
Assignment 3

Show all your work

Name: _____
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 Score: ____/20

Problem 1: Find the measure of angle x to make a hole-in-one at the miniature golf course hole. Use the following two facts to find x :







- The angle the ball makes as it hits a flat surface has the same measure as the angle the ball makes as it leaves the same surface.
- The interior angle sum of a triangle is 180° .



Starting at 63° using condition (a), alternate interior angles of parallel lines, and complementary angles of a right triangle, we reach $x = 27^\circ$.

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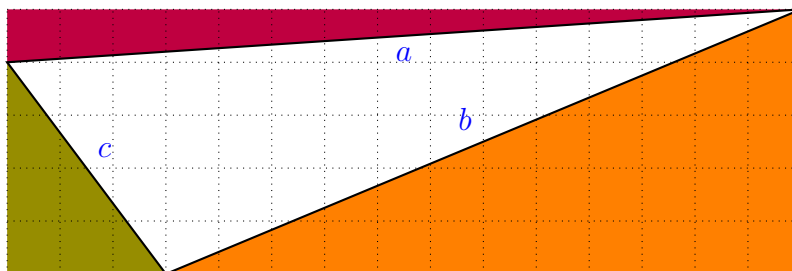
Problem 2: Set up a table for convex polygons' angle sums beginning with a triangle, followed by a quadrilateral, a pentagon, and so on. From your table, derive a formula for the measure of the interior angle sum in a regular n -sided polygon.

Polygon:							n -gon
Angle sum:	180	360	540	720	900	1080	... $180(n - 2)$

Lisa changed the question to ask for one interior angle, so an interior angle has $180(n - 2)/n$ degrees.

Score: /3

Problem 3: Below is a 5×15 grid containing a big triangle. Find the area and perimeter of the big triangle. Show your work.



Use the area of the rectangle minus the area of the three corner triangles:

$$5 \times 15 - (1 \times 15 + 3 \times 4 + 12 \times 5)/2 = 75 - 43.5 = 31.5 \text{ square units.}$$

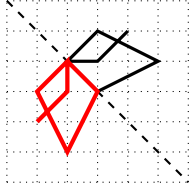
Since the corner triangles are right-angled, $a^2 = 1^2 + 15^2 = 226$, so $a = \sqrt{226}$;

$b^2 = 5^2 + 12^2 = 169$, so $b = \sqrt{169} = 13$; and $c^2 = 4^2 + 3^2 = 25$, so $c = \sqrt{25} = 5$. Therefore

the perimeter of the given triangle is $a + b + c = \sqrt{226} + 13 + 5 = 18 + \sqrt{226} \approx 33.03$.

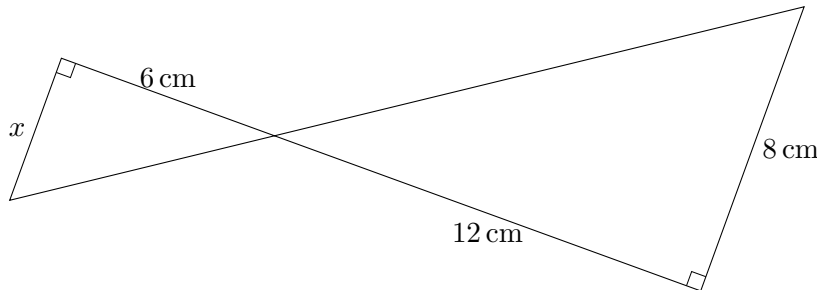
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Problem 4: Draw a reflection of the given figure along the given line.



Score: /2

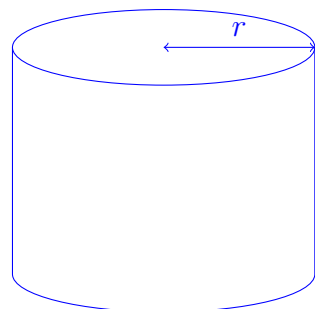
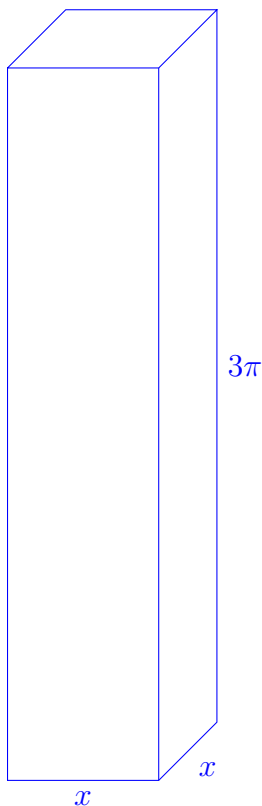
Problem 5: Find $x =$ 4 cm . Name the triangles and provide reasons for your claim.



The two inner angles are vertically opposite so equal. Since each triangle has a right angle, the third angles have to be equal, too. Hence the triangles are similar and $\frac{x}{6} = \frac{8}{12}$, so $x = 6 \times \frac{8}{12} = 4$.

Score: /3

Problem 6: Draw a square-based rectangular prism of height 3π cm and a volume of 12π cm³. Suppose that a right cylinder of height 3 cm also have the same volume as the rectangular prism. Which solid has a bigger surface area? Show all steps.



The volume of the box is $x^2 \cdot 3\pi = 12\pi$, so $x^2 = 4$, so $x = 2$. Therefore the area of the box is

$$2x^2 + 4x \cdot 3\pi = 8 + 24\pi.$$

The volume of the cylinder is $\pi r^2 \cdot 3 = 12\pi$, so $r^2 = 4$, so $r = 2$.

Therefore the area of the cylinder is

$$2\pi r^2 + 2\pi r \cdot 3 = 8\pi + 12\pi = 20\pi.$$

Clearly, the area of the box is much larger.

Score: /5