1.10 Extension: Confidence intervals and the margin of error

Learn to use and intepret common notation for confidence intervals (see MathBootCamps)

- Plus or minus a *margin of error*. e.g. $v = 24.8 \pm 4.5$
- As an interval or range, $(20.3, 29.3)$. (brackets are also used, i.e. $[20.3, 29.3]$)
- As an inequality, $20.3 \leq v \leq 29.3$

1. The height of a Christmas tree rounded to the nearest foot is 7 feet. What is the shortest the tree could be? The tallest? Express your answer as an interval or range, with parenthesis.

2. Express the value $v = 10 \pm 1.5$ as an inequality.

3. A person's weight is estimated as 125 lbs. plus or minus 5 lbs. Express that as a percent, i.e. in the form $125 \pm x\%$.

4. The radius of a circle rounded to the nearest foot is 10 feet. Find the possible values for the area of the circle. Express your answer as an interval / range.

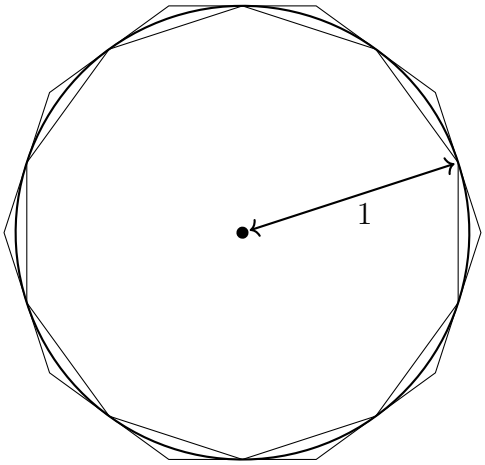
5. The length of a rectangular field is between 20 and 21 meters, and its width is between 8 and 9 meters. Find the area of the field, expressed as an inequality.

Inscribed area: 2.9389

Cos inv multiplier: 1.051462224238267212

Circumscribed area: 3.2492

6. The diagram shows a circle sandwiched between two decagons (10-sided polygons). The area of the smaller, inscribed decagon is $A_{inner} \approx 2.9389$ and the larger, circumscribed decagon's area is $A_{outer} \approx 3.2492$. Use these bounds to approximate π plus or minus a margin of error.



7. Find the area of the $\triangle ABC$ is shown below with $A(3,2)$, $B(7,4)$, and $C(4,8)$.

   (a) First find the area of the red rectangle with sides $b = 4$, $h = 6$.

   (b) Find the area of the three triangles surrounding $\triangle ABC$ in the rectangle.

   (c) Subtract their areas from the rectangle to find $A_{\triangle ABC}$