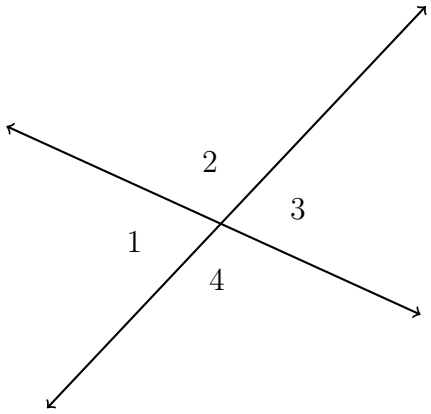
11.7 Homework: Circle Angles

1. Given $A(-1, 2)$ and $B(-6, 14)$, find the length of $\overline{AB}$. Show the substitution into the distance formula.

2. Two lines intersect to make four angles: $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$, as shown.



   (a) How are $\angle 1$ and $\angle 2$ related?

   - ☐ Vertical angles
   - ☐ Complementary angles
   - ☐ Supplementary angles
   - ☐ Opposite angles
   - ☐ Linear pair

   (b) Given $m\angle 1 = 75°$.

   i. Find $m\angle 3$

   ii. Find $m\angle 4$

3. A regular heptagon (7 sides) is inscribed in a circle with a radius $r = 14$. Find each value (in terms of π unless otherwise instructed).

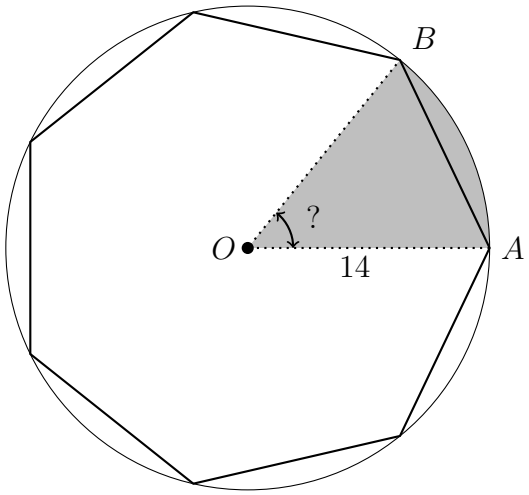
   (a) $m\angle AOB$ to the *nearest degree.*

   (b) The circle circumference. ($C = 2\pi r$)

   (c) The length of the arc $\overset{\frown}{AB}$

   (d) The circle's area. ($A = \pi r^2$)

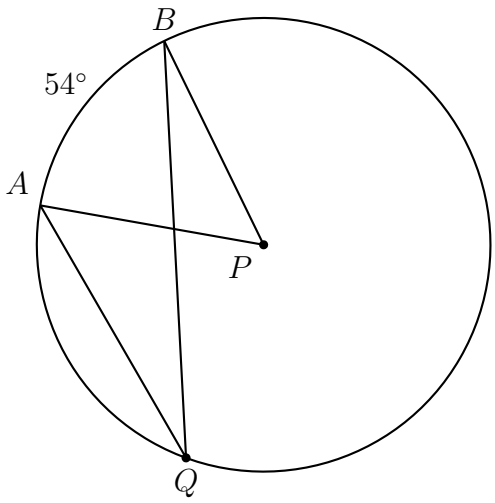
   (e) The sector area (shaded)



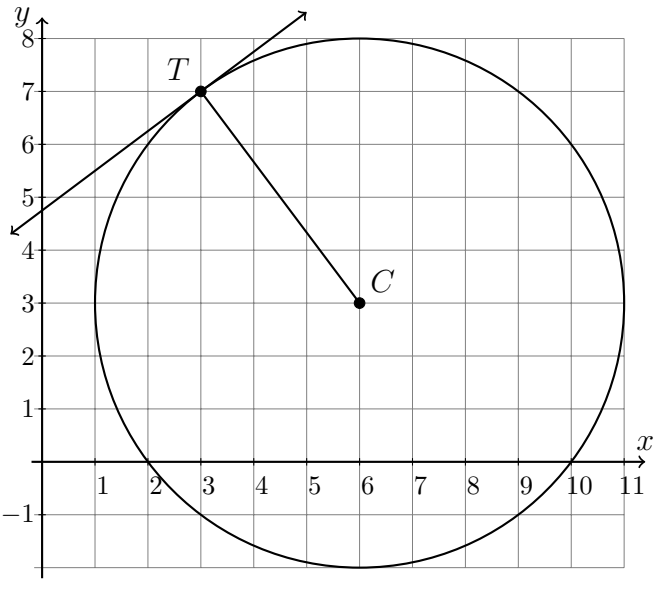
4. Given circle P with $m\overset{\frown}{AB} = 54°$.

   (a) Write down the $m\angle APB$.

   (b) Find the $m\angle AQB$.



5. A circle on the coordinate plane has center C and radius $\overline{CT}$. A tangent line through point T is drawn, as shown.



   (a) Write down the center of the circle as a coordinate pair.

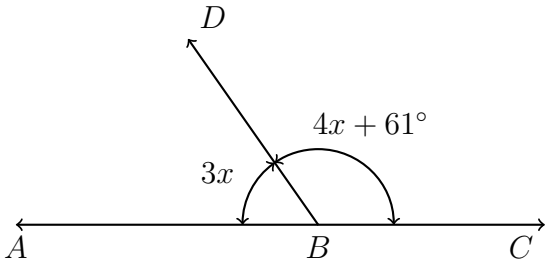
   (b) Write down the equation of the circle.

   (c) What is the slope of the radius $\overline{CT}$?

   (d) Find the slope of the tangent line.

6. Two supplementary angles have measures $m\angle ABD = 3x$ and $m\angle DBC = 4x + 61°$.

   Write an equation applying the angle addition theorem, then find x.



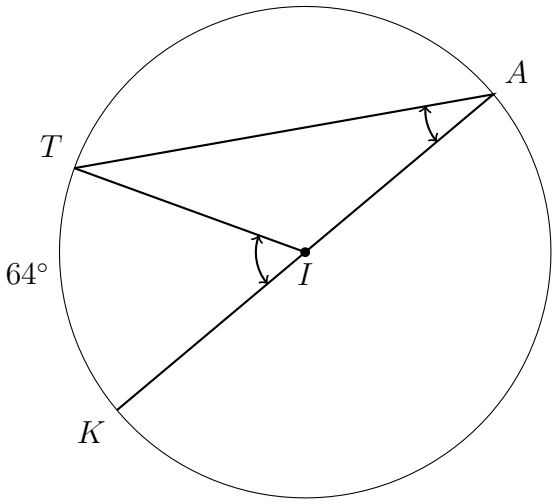
7. Given circle with center I and $m\widehat{KT} = 64°$. Find the measure of each angle.

   (a) $m\angle KIT$

   (b) $m\angle KAT$

   (c) $m\angle TIA$

   (d) $m\angle ATI$

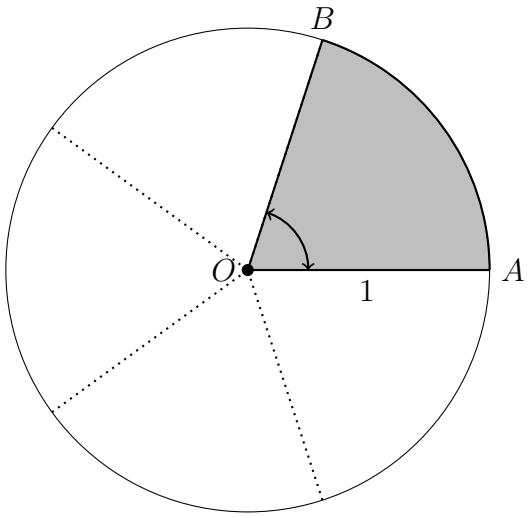


8. The shaded sector of the unit circle is *one fifth* of the whole circle, as shown. (Circle circumference and area formulas: $C = 2\pi r$, $A = \pi r^2$)

   (a) Find $m\angle AOB$ in *degrees*.

   (b) Find the length of the arc $\widehat{AB}$ in terms of π.

   (c) Find the area of the shaded sector in terms of π.

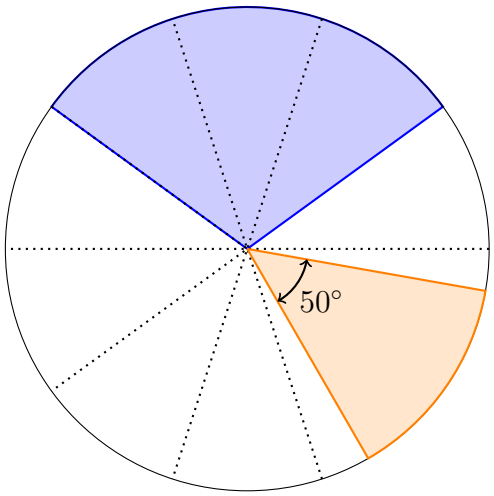


9. Given a triangle $\triangle ABC$ having angles with measures $m\angle A = 42°$ and $m\angle B = 89°$. Find the measure of the third angle, $m\angle C$.

10. The *pie chart* below shows the proportion of two subsets of a population, one represented in blue and one in orange. Dotted lines divide the circle in ten equal sectors for reference.

    (a) Estimate the area of the blue sector as a fraction of the circle and as a decimal.

    (b) The central angle of the orange sector measures 50°. Find the fraction of circle's area shaded orange as a fraction and a decimal.



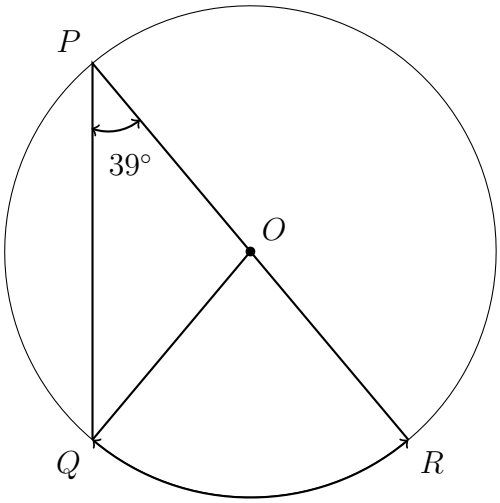
11. Given circle with center O and $m\angle QPR = 39°$. Find the measure of each arc or angle.

    (a) $m\widehat{QR}$

    (b) $m\angle PQO$

    (c) $m\angle QOR$

    (d) $m\angle POQ$



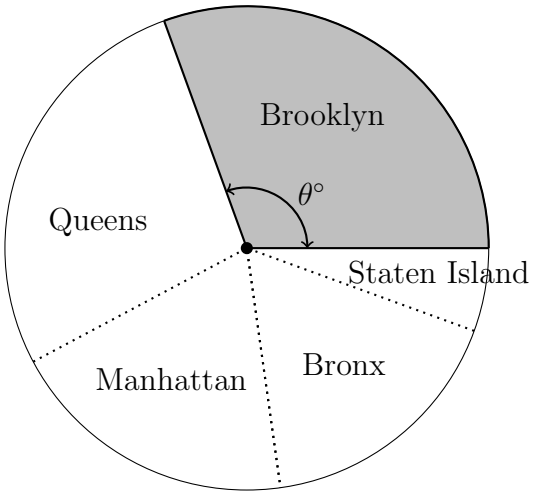
12. The *pie chart* below represents the population of the city of New York, with each borough's population a proportional sector.

    Population of NY City is 8,336,000
    Population of Brooklyn is 2,560,000

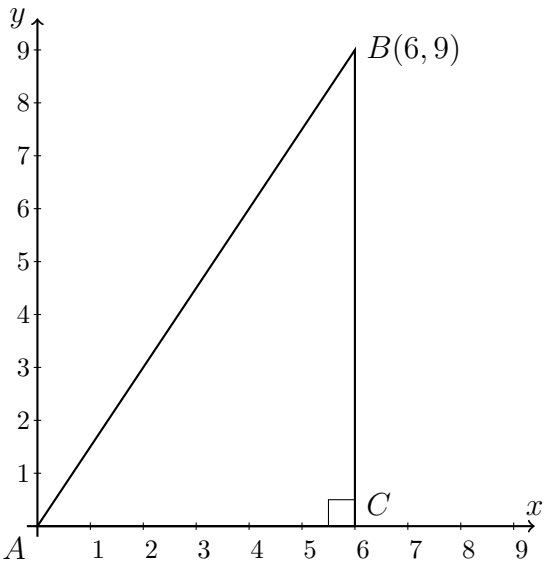
    (a) Find the fraction of New Yorkers, x, who reside in Brooklyn as a percentage.

    (b) Find the central angle of the shaded area, $\theta = x \times 360°$

New York City



13. Right $\triangle ABC$ is drawn in *standard position* with vertex A on the origin and right $\angle C$ on the x-axis, as shown.



(a) Find the length of the hypotenuse AB using the Pythagorean Theorem $a^2 + b^2 = c^2$. (leave as a radical)

(b) Find the slope of the line segment $\overline{AB}$ as a decimal.

14. Convert between units.

    General method: if $A = B$ multiply by $\frac{A}{B}$ or $\frac{B}{A}$. For example, π radians $= 180$ degrees so
    $r = d \times \frac{\pi}{180}$ and $d = r \times \frac{180}{\pi}$

    (a) $35° =$? radians

    (b) $\frac{\pi}{9} =$? degrees

    (c) 1 foot = 12 inches

    4.25 feet =

    (d) 70 inches =

    (e) 1 euro = 1.21 dollars

    50 euro =

    (f) 50 dollars =

    (g) 1 mile = 5,280 feet

    11,000 feet =

    (h) $\frac{3}{4}$ mile =

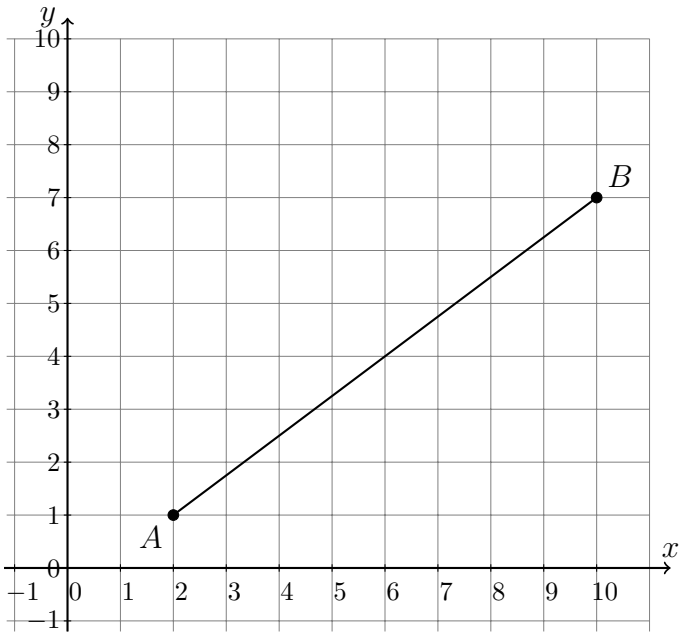
15. Line segment $\overline{AB}$, $A(2, 1)$, $B(10, 7)$, is the diameter of circle M.

    (a) On the grid, mark and label as a coordinate pair the midpoint of the segment, the circle center M.

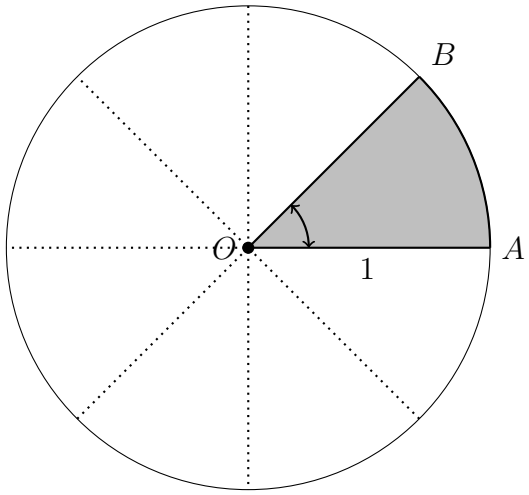
    (b) Calculate the length of $\overline{AB}$ and hence, the radius of the circle.

    (c) Write down the equation of the circle.

    (d) Sketch the circle on the grid or draw it with Geogebra or Graspable Math.



16. The shaded sector of the unit circle is *one eighth* of the whole circle, as shown. (Circle circumference and area formulas: $C = 2\pi r$, $A = \pi r^2$)



(a) Find $m\angle AOB$ in *degrees*.

(b) Find the length of the arc $\overset{\frown}{AB}$ in terms of π.

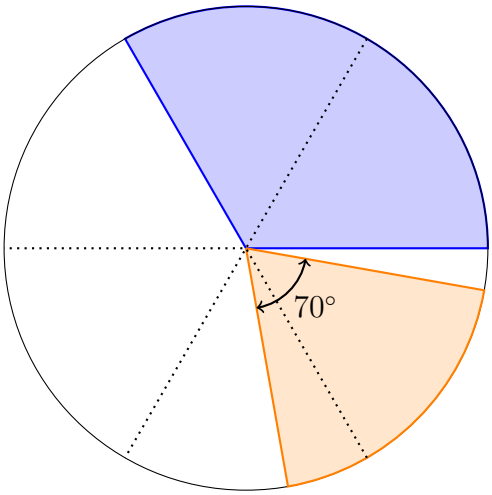
(c) Find the area of the shaded sector in terms of π.

17. Given a triangle $\triangle ABC$ having angles with measures $m\angle A = 37°$ and $m\angle B = 78°$. Find the measure of the third angle, $m\angle C$.

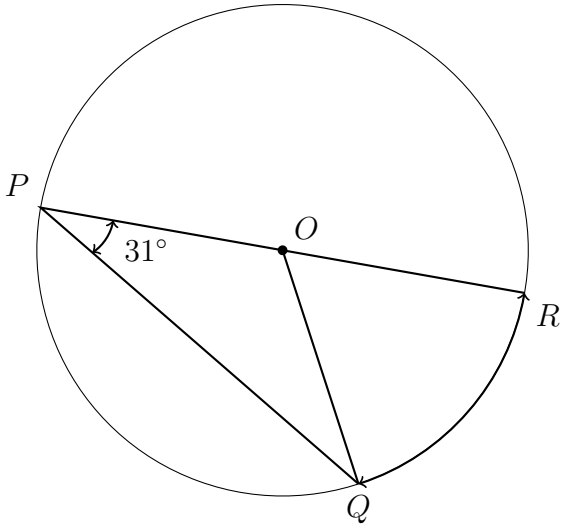
18. The *pie chart* below shows the proportion of two subsets of a population, one represented in blue and one in orange. Dotted lines divide the circle in six equal sectors for reference.

(a) Estimate the area of the blue sector as a fraction of the circle and as a decimal.

(b) The central angle of the orange sector measures 70°. Find the fraction of circle's area shaded orange as a fraction and a decimal.



19. Given circle with center O and $m\angle QPR = 31°$. Find the measure of each arc or angle.



(a) $m\widehat{QR}$

(b) $m\angle QOR$

(c) $m\angle POQ$

(d) $m\angle PQO$

20. The *pie chart* below represents the population of the city of New York, with each borough's population a proportional sector.

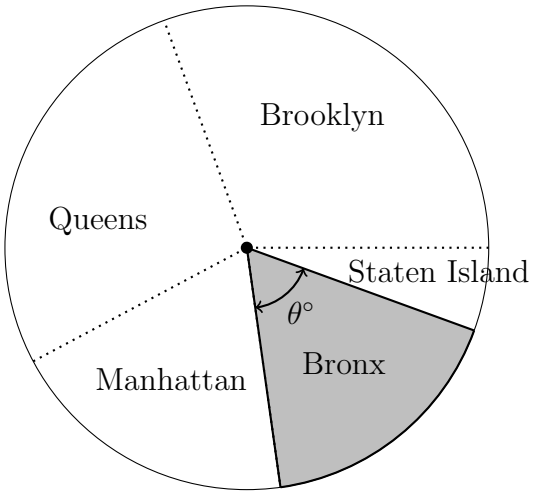
Population of NY City is 8,336,000
Population of the Bronx is 1,420,000

area, $\theta = x \times 360°$

(a) Find the fraction of New Yorkers, x, who reside in the Bronx as a percentage.

(b) Find the central angle of the shaded

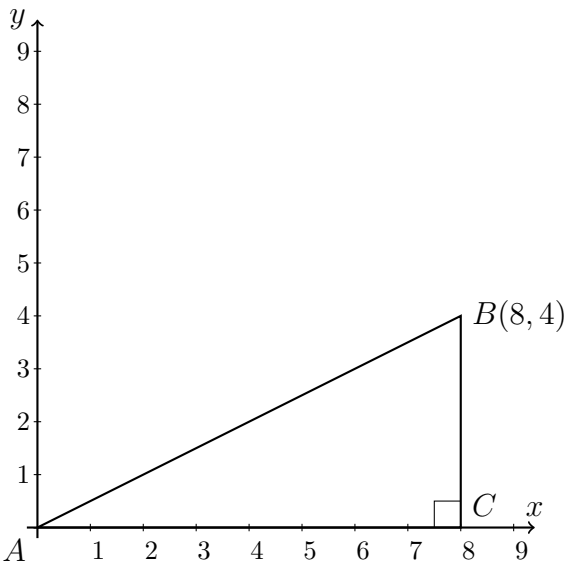
New York City



21. Right $\triangle ABC$ is drawn in *standard position* with vertex A on the origin and right $\angle C$ on the x-axis, as shown.

    (a) Find the length of the hypotenuse AB using the Pythagorean Theorem $a^2 + b^2 = c^2$. (leave as a radical)

    (b) Find the slope of the line segment $\overline{AB}$ as a decimal.



22. Line segment $\overline{AB}$, $A(0, 2)$, $B(8, 8)$, is the diameter of circle M.

    (a) On the grid, mark and label as a coordinate pair the midpoint of the segment, the circle center M.

    (b) Calculate the length of $\overline{AB}$ and hence, the radius of the circle.

    (c) Write down the equation of the circle.

    (d) Sketch the circle on the grid or draw it with Geogebra or Graspable Math.

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