Lesson 6: Drawing Geometric Shapes

Classwork

Exploratory Challenge

Use a ruler, protractor, and compass to complete the following problems.

1. Use your ruler to draw three segments of the following lengths: 4 cm, 7.2 cm, and 12.8 cm. Label each segment with its measurement.

2. Draw complementary angles so that one angle is $35°$. Label each angle with its measurement. Are the angles required to be adjacent?

3. Draw vertical angles so that one angle is $125°$. Label each angle formed with its measurement.

4. Draw three distinct segments of lengths 2 cm, 4 cm, and 6 cm. Use your compass to draw three circles, each with a radius of one of the drawn segments. Label each radius with its measurement.

5. Draw three adjacent angles $a°$, $b°$, and $c°$ so that $a = 25°$, $b = 90°$, and $c = 50°$. Label each angle with its measurement.

6. Draw a rectangle $ABCD$ so that $AB = CD = 8$ cm and $BC = AD = 3$ cm.

7. Draw a segment AB that is 5 cm in length. Draw a second segment that is longer than AB and label *one* endpoint C. Use your compass to find a point on your second segment, which will be labeled D, so that $CD = AB$.

8. Draw a segment AB with a length of your choice. Use your compass to construct two circles:
   i. A circle with center A, and radius AB.
   ii. A circle with center B, and radius BA.

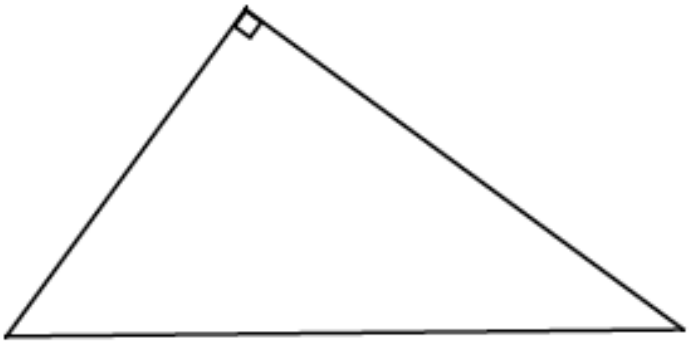
   Describe the construction in a sentence.

9. Draw a horizontal segment AB, 12 cm in length.
   a. Draw a point O on AB that is 4 cm from B.
   b. Point O will be the vertex of an angle $\angle COB$.
   c. Draw ray OC so that the ray is above AB and $\angle COB = 30°$.
   d. Draw a point P on AB that is 4 cm from A.
   e. Point P will be the vertex of an angle $\angle QPO$.
   f. Draw ray PQ so that the ray is above AB and $\angle QPO = 30°$.

10. Draw segment AB of length 4 cm. Draw the same circle from A and from B (i.e., do not adjust your compass in between) with a radius of a length that allows the two circles to intersect in two distinct locations. Label the points where the two circles intersect C and D. Join A and C with a segment; join B and C with a segment. Join A and D with a segment; join B and D with a segment.

    What kind of triangles are $\triangle ABC$ and $\triangle ABD$? Justify your response.

11. Determine all possible measurements in the following triangle and use your tools to create a copy of it.



Problem Set

Use a ruler, protractor, and compass to complete the following problems.

1. Draw a segment AB that is 5 cm in length, perpendicular to segment CD, 2 cm in length.

2. Draw supplementary angles so that one angle is $26°$. Label each angle with its measurement.

3. Draw triangle $\triangle ABC$ so that $\angle B$ has a measurement of $100°$.

4. Draw a segment AB that is 3 cm in length. Draw a circle with center A and radius AB. Draw a circle with diameter AB.

5. Draw an isosceles triangle $\triangle ABC$. Begin by drawing $\angle A$ with a measurement of $80°$. Use the rays of $\angle A$ as the equal legs of the triangle. Choose a length of your choice for the legs and use your compass to mark off each leg. Label each marked point with B and C. Label all angle measurements.

6. Draw an isosceles triangle $\triangle DEF$. Begin by drawing a horizontal segment DE that is 6 cm in length. Use your protractor to draw $\angle D$ and $\angle E$ so that the measurements of both angles are $30°$. If the non-horizontal rays of $\angle D$ and $\angle E$ do not already cross, extend each ray until the two rays intersect. Label the point of intersection F. Label all side and angle measurements.

7. Draw a segment AB that is 7 cm in length. Draw a circle with center A and a circle with center B so that the circles are not the same size, but do intersect in two distinct locations. Label one of these intersections C. Join A to C and B to C to form $\triangle ABC$.

8. Draw an isosceles trapezoid $WXYZ$ with two equal base angles $\angle W$ and $\angle X$ that each measure $110°$. Use your compass to create the two equal sides of the trapezoid. Leave arc marks as evidence of the use of your compass. Label all angle measurements. Explain how you constructed the trapezoid.