Exam: Introduction to logic and proof, angle pairs

1. Points that are all located on the same line are _____.

2. Given $C(1, -2)$ and $D(7, 9)$, find the coordinates of the midpoint of $\overline{CD}$, the point M.

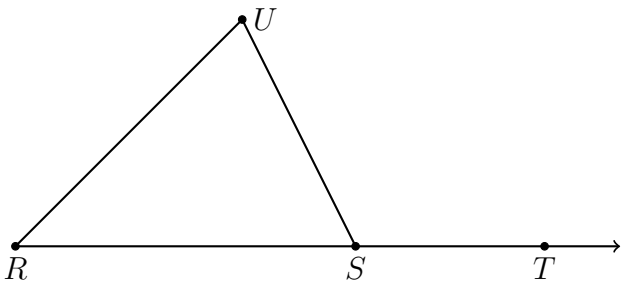
3. Given the conditional statement, "If two triangles' corresponding sides are congruent, then their corresponding angles are congruent."

   (a) Write down the conclusion of the statement.

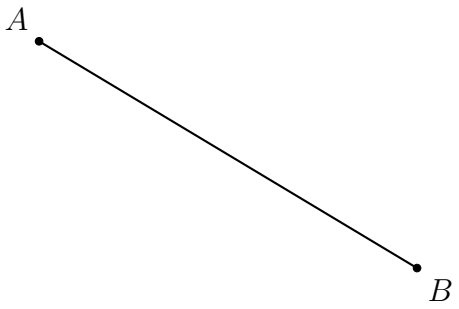
   (b) Write down the negation of the hypothesis.

   (c) Write down the converse of the statement.

4. Given $m\angle R = 50$, $m\angle U = 65$, and $m\angle UST = 115$. Find $m\angle RSU$.



5. Construct an equilateral triangle with one side the given line segment $\overline{AB}$.



6. Given the square $BECA$ with $BE = 2.50$.

   (a) Find the area of $BECA$.

   (b) Find the perimeter of $BECA$.

7. Given $m\angle A = 75$, $m\angle B = 45$, $m\angle C = 165$, $m\angle DEF = 55$, $m\angle FEG = 15$.

   (a) Find a pair of complementary angles. _____ _____

   (b) Find a pair of supplementary angles. _____ _____

8. Find the value of $|\sqrt{11} - \frac{3}{2}| - \sqrt{11}$.

9. Given $P(-2, 4)$ and $Q(1, 0)$, find the length of $\overline{PQ}$.

10. In a proof, each of the following statements are written. Write down the reason that would justify each step.

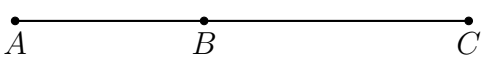
    (a) $2(DE + FG) = 2DE + 2FG$ _____ property

    (b) $\overline{EF} \cong \overline{EF}$ _____ property

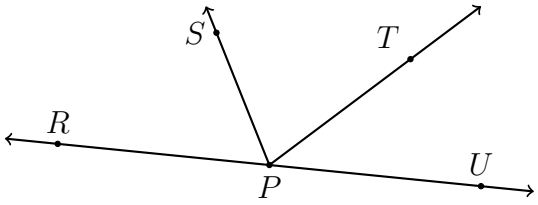
    (c) $DE + EF = FG + EF$ _____ property

11. Given $\overline{ABC}$, $AC = 15$, and the point B partitions $\overline{AC}$ in a ratio of 2:3.

    Find AB.



12. Given the situation in the diagram, answer each question. Circle True or False.



(a) True or False: $\angle SPU$ is an obtuse angle.

(b) True or False: $\overrightarrow{PR}$ and $\overrightarrow{PU}$ are opposite rays.

(c) True or False: $\angle RPT$ and $\angle SPU$ are a linear pair.

(d) True or False: $\angle SPT$ and $\angle TPU$ are adjacent.

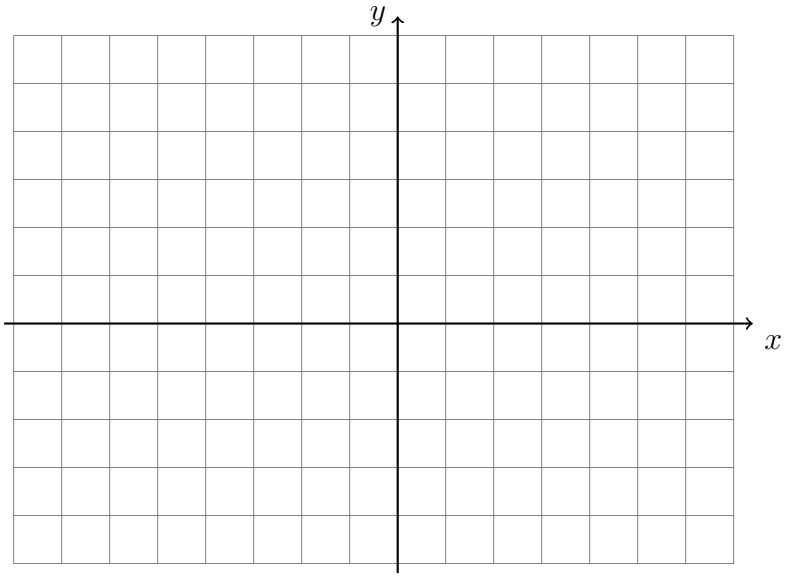
13. Given $B(-7, 4)$, $U(5, -1)$, and $Z(-7, -1)$.

(a) Plot and label the points on the graph, drawing $\overline{BU}$

(b) Draw the legs of the right triangle, $\overline{BZ}$ and $\overline{ZU}$, marking their lengths.

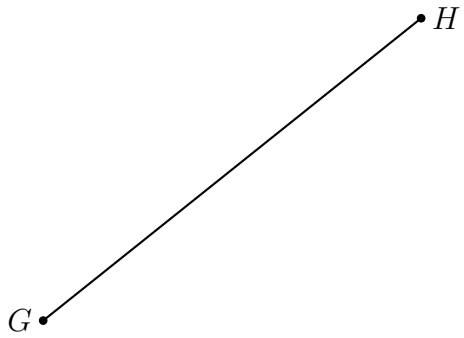
(c) Write down the distance formula for BU, substituting coordinate values.

(d) Find the value of BU.

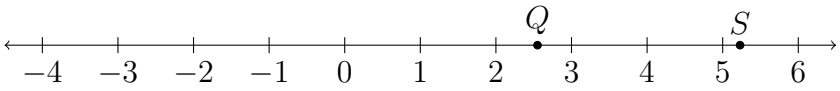


14. Given the circle C with circumference 10π. Find the area of C.

15. Construction a perpendicular bisector of the given line segment, $\overline{GH}$.



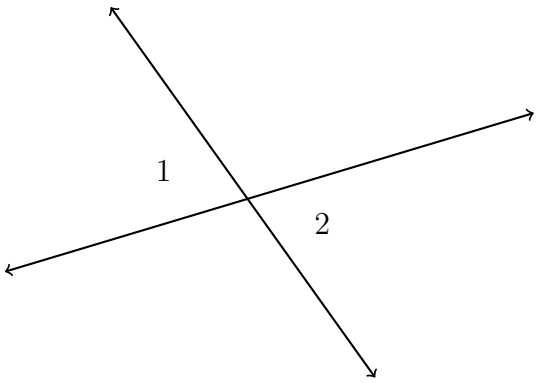
16. Given $\overleftrightarrow{QS}$ as shown on the number line, with Q having the coordinate 2.55 and S the coordinate 5.23.



(a) Find the value of the coordinate of the point R, the midpoint of $\overline{QS}$.

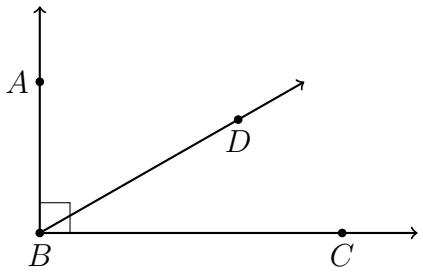
(b) The point P is collinear with $\overleftrightarrow{QS}$ such that Q is the midpoint of $\overleftrightarrow{PS}$. Mark P on the line and state the value of its coordinate.

17. Given two vertical angles, $m\angle 1 = 4x + 6$, $m\angle 2 = 6x - 32$. Find $m\angle 1$.
For full credit find the $m\angle 2$ as a check.

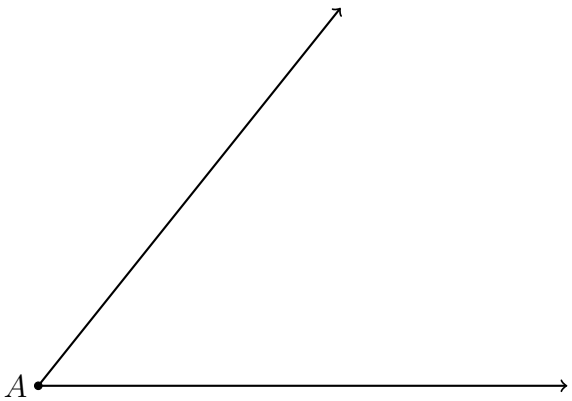


18. Given $\overrightarrow{BA} \perp \overrightarrow{BC}$, $m\angle ABD = 2x - 5$, and $m\angle DBC = x - 10$. Find $m\angle DBC$.

    For full credit, show the check using both angle measures.



19. Construct an angle bisector of the given angle.



20. Spicy: Construct the angle bisectors of the angles of the triangle and their intersection, the incenter.