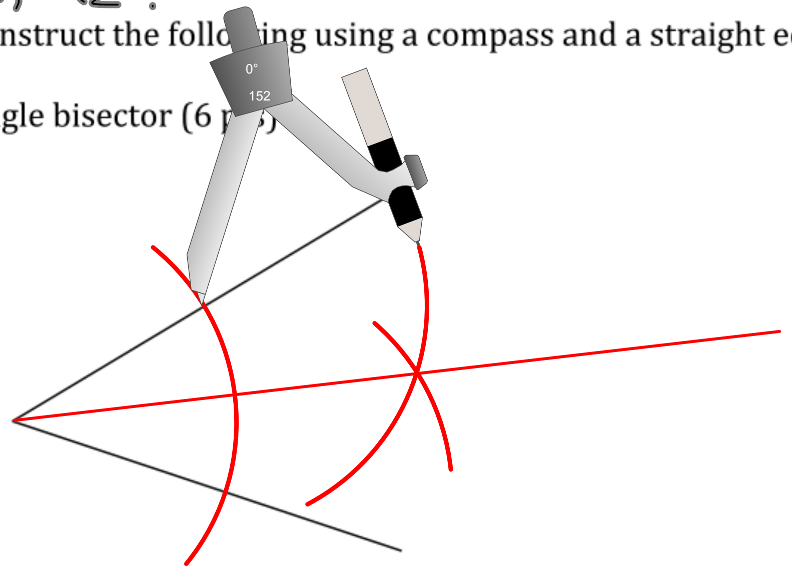
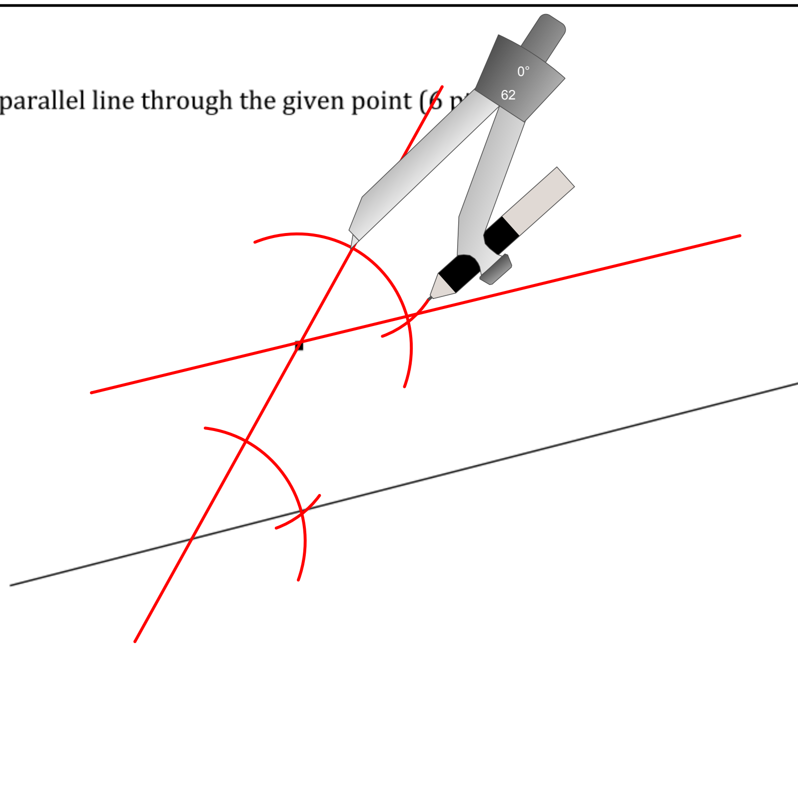
Exam 12.

1. Construct the follo[illegible]ing using a compass and a straight edge.

a. Angle bisector (6 p[illegible])



b. A parallel line through the given point (6 p[illegible]



2. ΔABC have its vertices at $A(2,3)$, $B(5,1)$, and $C(2,1)$. (20 pts)
Find the coordinates of its image after the given transformation. (Sketch is optional)

a. $\Delta ABC \xrightarrow{T_{2,-3}} \Delta A'B'C'$

$A(2,3) \longrightarrow A'(4,0)$
$B(5,1) \longrightarrow B'(7,-2)$
$C(2,1) \longrightarrow C'(4,-2)$

b. $\Delta ABC \xrightarrow{r_{y=x}} \Delta A''B''C''$

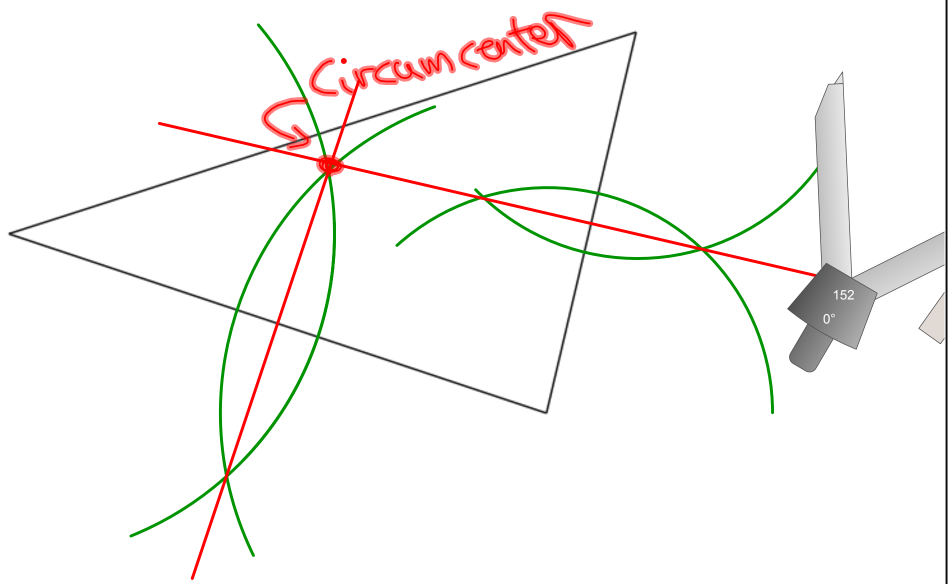
$A(2,3) \longrightarrow A''(3,2)$
$B(5,1) \longrightarrow B''(1,5)$
$C(2,1) \longrightarrow C''(1,2)$

c. $\Delta ABC \xrightarrow{R_{90^\circ,(0,0)}} \Delta A'''B'''C'''$

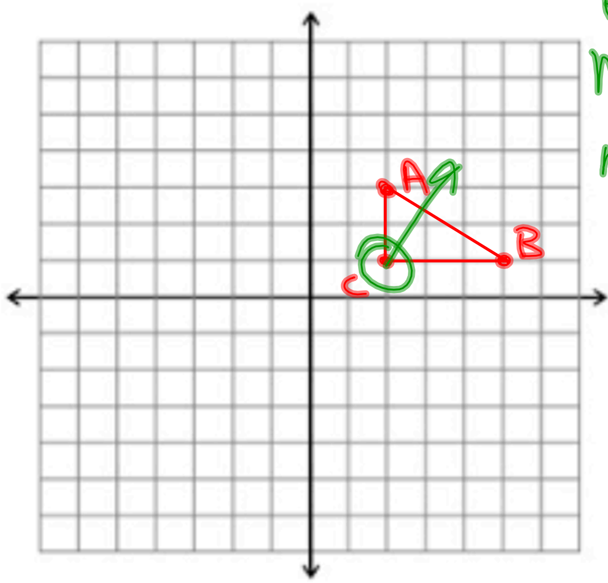
$A(2,3) \longrightarrow A'''(-3,2)$
$B(5,1) \longrightarrow B'''(-1,5)$
$C(2,1) \longrightarrow C'''(-1,2)$

$\perp$ bisectors.

3. Find the circumcenter of the triangle. (12 pts)



4. Find an equation of the altitude from C if ΔABC have its vertices at $A(2,3)$, $B(5,1)$, and $C(2,1)$. (6 pts)



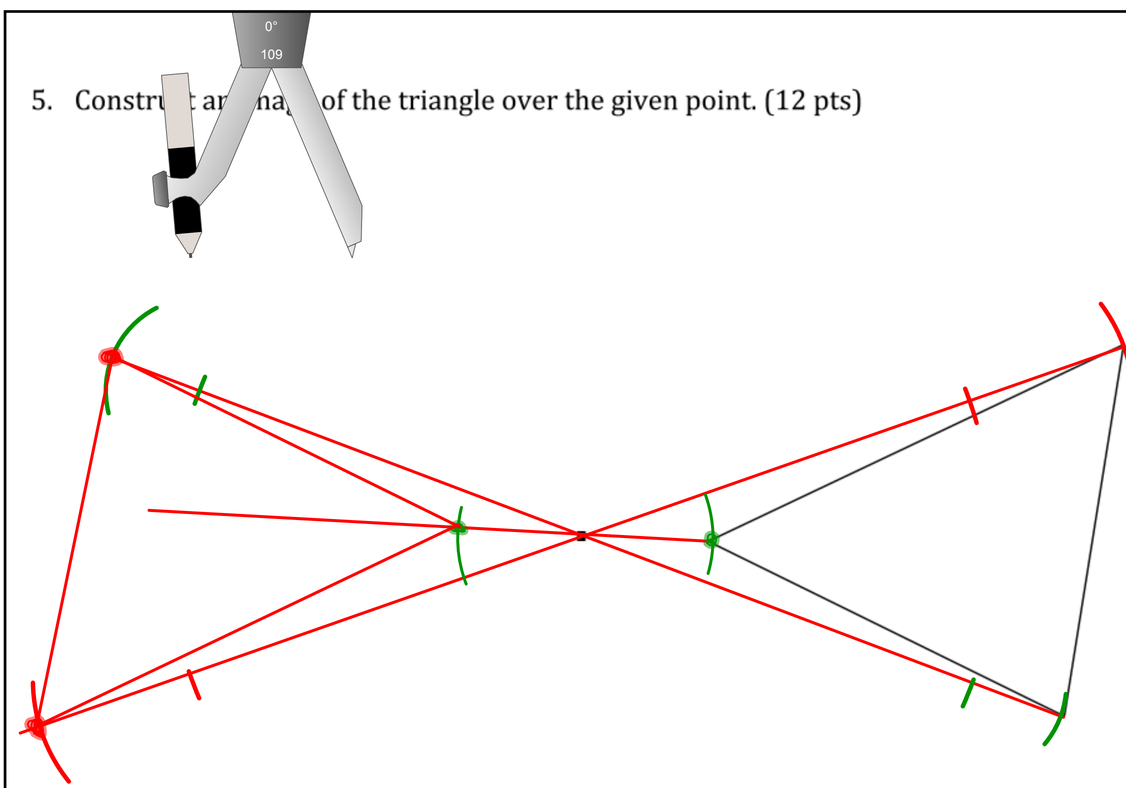
point c (2,1)

$m_{AB} = \frac{1-3}{5-2} = \frac{-2}{3}$

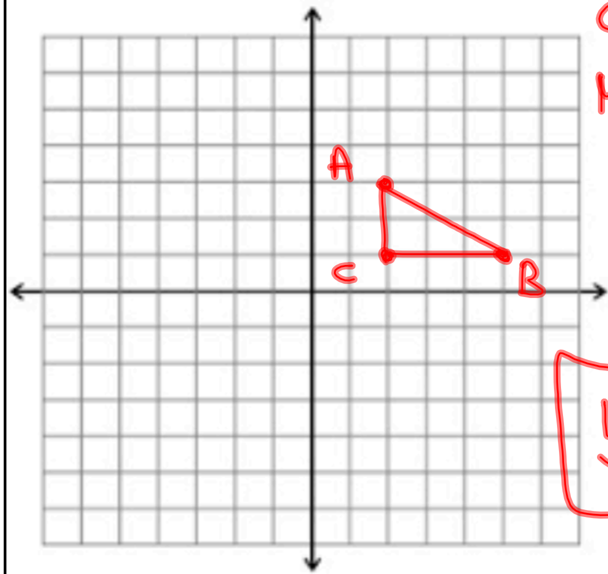
$m_{\perp} = \frac{3}{2}$

$\boxed{y-1 = \frac{3}{2}(x-2)}$

5. Construct an image of the triangle over the given point. (12 pts)



6. Find an equation of the median from C if ΔABC have its vertices at $A(2,3)$, $B(5,1)$, and $C(2,1)$. (8 pts)



$C\,(2,1)$

$$\underset{AB}{\text{Midpt}} = \left(\frac{2+5}{2}, \frac{3+1}{2}\right)$$

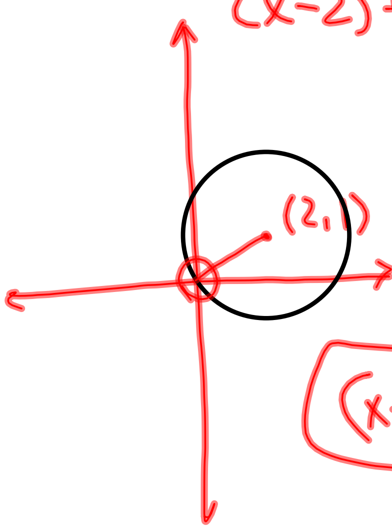
$$= (3.5, 2)$$

$$m = \frac{2-1}{3.5-2} = \frac{1}{1.5} = \frac{2}{3}$$

$$\boxed{y-1 = \frac{2}{3}(x-2)}$$

7. Find an equation of the circle if its center is at (2, 1) and passes through the origin. (8 pts)

$$(x-2)^2+(y-1)^2 = 5$$



$$D = r = \sqrt{(2-0)^2+(1-0)^2}$$

$$= \sqrt{5}$$

$$\boxed{(x-h)^2+(y-k)^2 = r^2}$$

8. Find the center and radius of the given equation. (10 pts)

$$x^2 - 6x + y^2 + 4y = 12$$

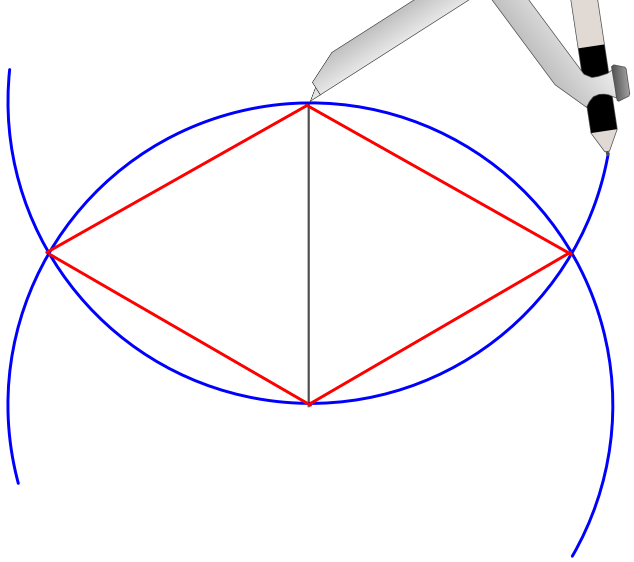
$x^2 - 6x + 9 \quad + y^2 + 4y + 4 = 12 + 9 + 4$

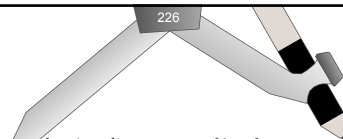
$(x-3)^2 + (y+2)^2 = 25$

C: $(3, -2)$

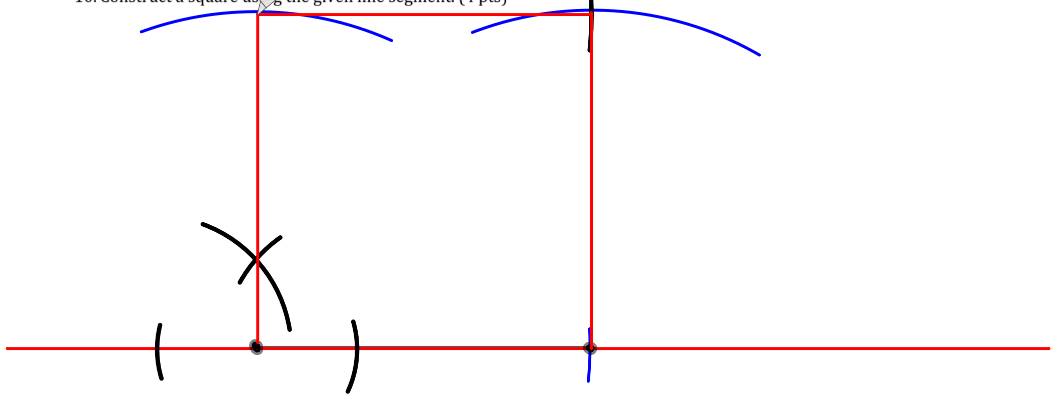
$r = 5$

9. Construct a rhombus by putting together two equilateral triangles, using the given line segment. (8 pts)





10. Construct a square using the given line segment. (4 pts)



4.

Given: $\overline{AB} \cong \overline{AC}$

$\overline{AD} \cong \overline{AE}$

Prove: $\overline{BF} \cong \overline{CF}$