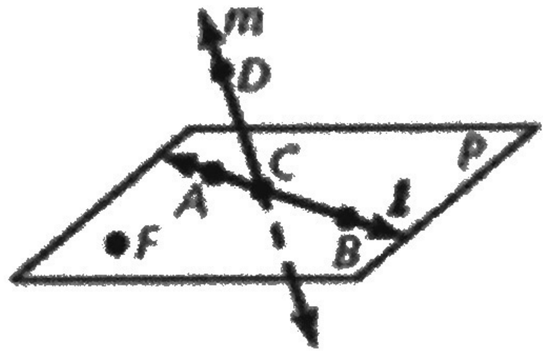
Name: Key
Geometry

Date:_____
Band:_____

Basics of Geometry Study Guide

1.1 Points, Lines, and Planes

Use the diagram at the right.



1. Give another name for plane P.

plane AFC, AFB, CBF

2. Name a line in the plane.

$\overleftrightarrow{AC}$, $\overleftrightarrow{AB}$, $\overleftrightarrow{CB}$

3. Name a ray.

$\overrightarrow{CA}$, $\overrightarrow{AC}$, $\overrightarrow{CB}$, $\overrightarrow{BC}$, $\overrightarrow{AB}$, $\overrightarrow{BA}$

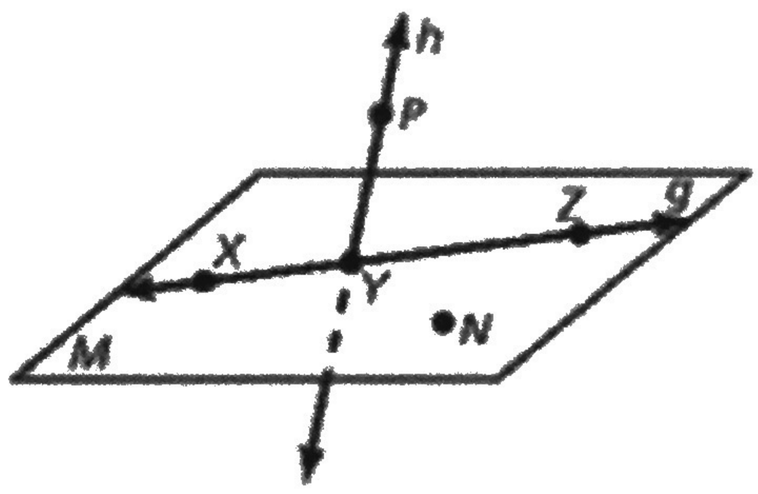
4. Name a line intersecting the plane.

$\overleftrightarrow{CD}$ or line m

5. Name three collinear points.

points A, C, B

Use the diagram.



6. Give another name for plane M.

plane XYN, XZN, YZN

7. Name a line in the plane.

$\overleftrightarrow{XZ}$, $\overleftrightarrow{XY}$, $\overleftrightarrow{YZ}$

8. Name a line intersecting the plane.

$\overleftrightarrow{PY}$ or line h

9. Name two rays.

$\overrightarrow{YZ}$, $\overrightarrow{ZY}$, $\overrightarrow{XY}$, $\overrightarrow{YX}$, $\overrightarrow{XZ}$, $\overrightarrow{ZX}$

10. Name a pair of opposite rays.

$\overrightarrow{YZ}$ and $\overrightarrow{YX}$

11. Name a point not in the plane M.

point P

1.2 Measuring and Constructing Segments

12. Find AC.

$AC = AB + BC$

$AC = 12 + 25 = \boxed{37}$

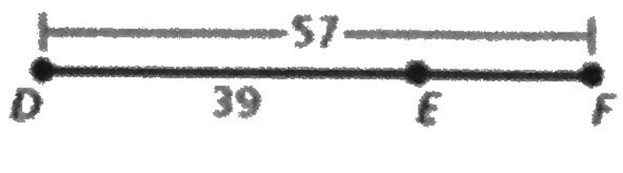
Find XZ.

14.

$XZ = XY + YZ$

$XZ = 17 + 24 = \boxed{41}$

13. Find EF.

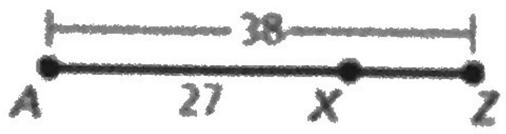


$DF = DE + EF$

$57 = 39 + EF$

$EF = \boxed{18}$

15.

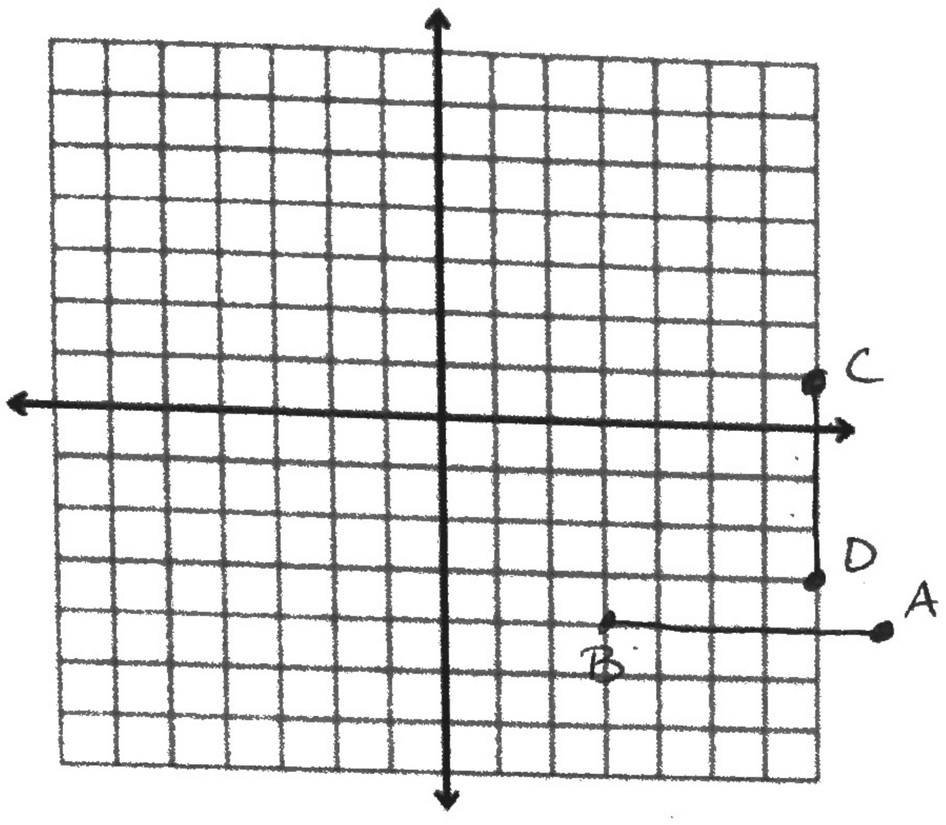


$AZ = AX + XZ$

$38 = 27 + XZ$

$\boxed{11} = ZX$

16. Plot $A(8,-4), B(3,-4), C(7,1)$, and $D(7,-3)$ in a coordinate plane. Then determine whether $\overline{AB}$ and $\overline{CD}$ are congruent.

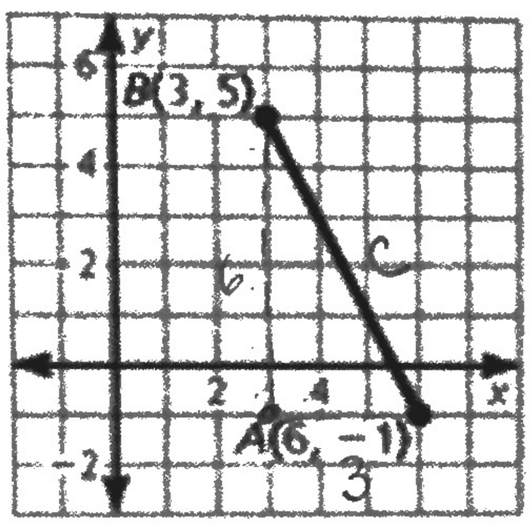


AB = 5 CD = 4

not congruent (different lengths)

1.3 Using Midpoint and Distance Formulas

17. The endpoints of $\overline{AB}$ are $A(6,-1)$ and $B(3,5)$. Find the coordinates of the midpoint M. Then find the distance between points A and B.



$M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$M = \left(\frac{3+6}{2}, \frac{5+-1}{2}\right)$

$M = \left(\frac{9}{2}, \frac{4}{2}\right)$

$M = \left(4\frac{1}{2}, 2\right)$

$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ or $a^2+b^2=c^2$

$d = \sqrt{(3-6)^2+(5--1)^2}$

$d = \sqrt{(-3)^2+(6)^2}$

$d = \sqrt{9+36}$

$d = \sqrt{45}$

$6^2+3^2=c^2$

$36+9=c^2$

$45=c^2$

or $\sqrt{45}=c$

Find the coordinates of the midpoint M. Then find the distance between points S and T.

18. $S(-2,4)$ and $T(3,9)$

$M = \left(\frac{-2+3}{2}, \frac{4+9}{2}\right)$

$M = \left(\frac{1}{2}, \frac{13}{2}\right)$

$d = \sqrt{(-2-3)^2+(4-9)^2}$

$d = \sqrt{(-5)^2+(-5)^2}$

$d = \sqrt{25+25}$

$d = \sqrt{50}$

19. $S(6,-3)$ and $T(7,-2)$

$M = \left(\frac{6+7}{2}, \frac{-3+-2}{2}\right)$

$M = \left(\frac{13}{2}, \frac{-5}{2}\right)$

$d = \sqrt{(6-7)^2+(-3--2)^2}$

$d = \sqrt{(-1)^2+(-1)^2}$

$d = \sqrt{1+1}$

$d = \sqrt{2}$

20. The midpoint of $\overline{JK}$ is $M(6,3)$. One endpoint is $J(14,9)$. Find the coordinates of endpoint K.

$M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$(6,3) = \left(\frac{x+14}{2}, \frac{y+9}{2}\right)$

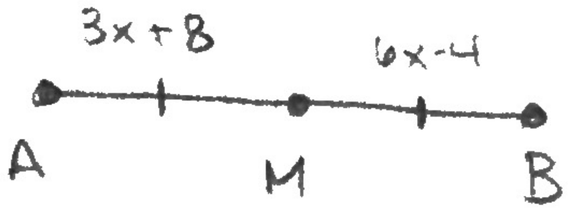
$6 = \frac{x+14}{2}$ $3 = \frac{y+9}{2}$

$12 = x+14$ $6 = y+9$

$-2 = x$ $-3 = y$

$K(-2,-3)$

21. Point M is the midpoint of $\overline{AB}$ where $AM = 3x + 8$ and $MB = 6x - 4$. Find AB.



$3x + 8 = 6x - 4$

$12 = 3x$

$4 = x$

$AB = AM + MB$

$AB = 3x + 8 + 6x - 4$

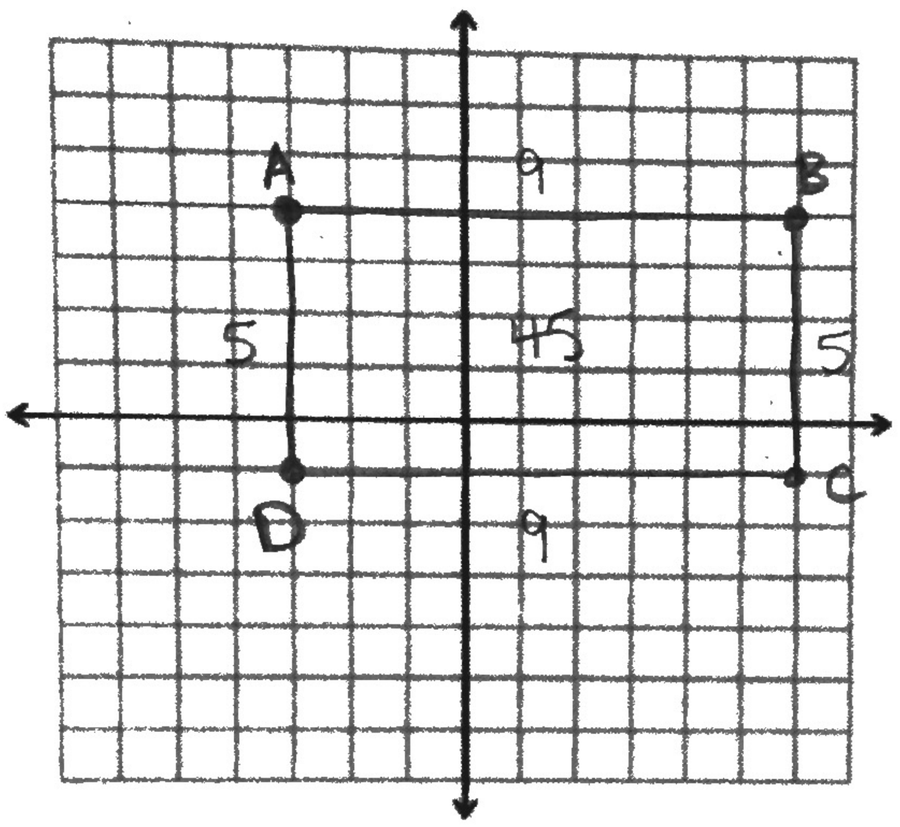
$AB = 9x + 4$

$AB = 9(4) + 4$

$AB = 40$

1.4 Perimeter and Area in the Coordinate Plane

22. Find the perimeter and area of rectangle $ABCD$ with vertices $A(-3,4), B(6,4), C(6,-1)$, and $D(-3,-1)$.

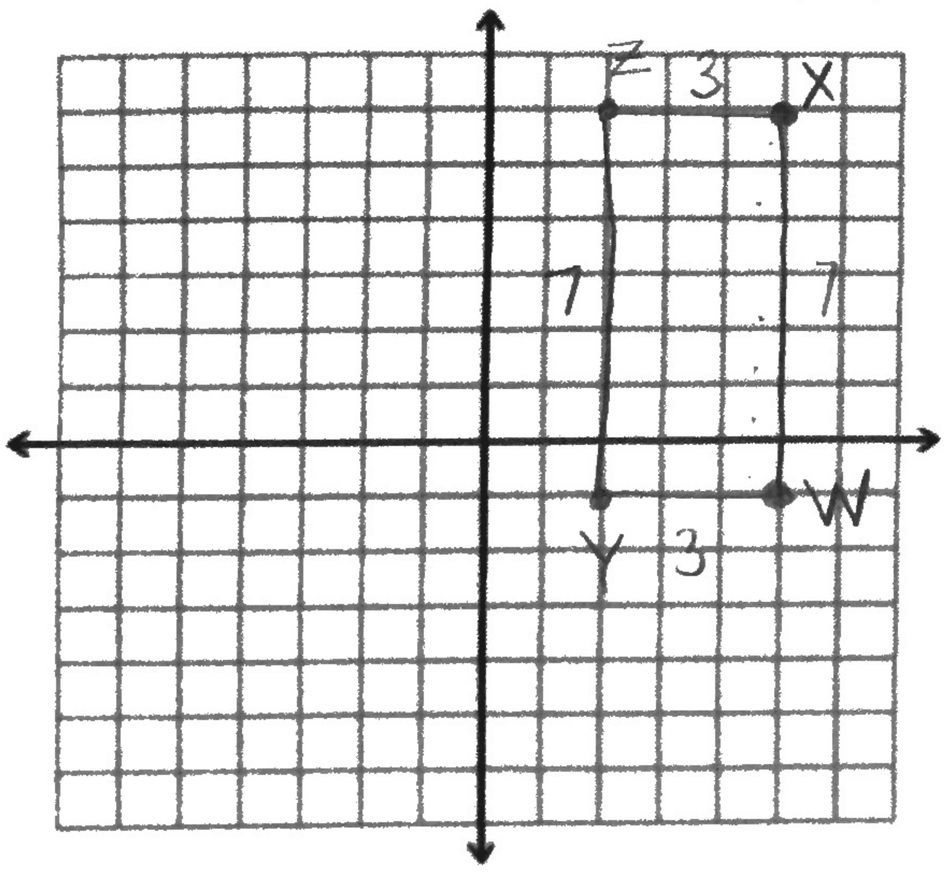


perimeter $= 9 + 5 + 5 + 9 = 28$

area $= l \cdot w = 9 \cdot 5 = 45$ or count boxes

Find the perimeter and area of the polygon with the given vertices.

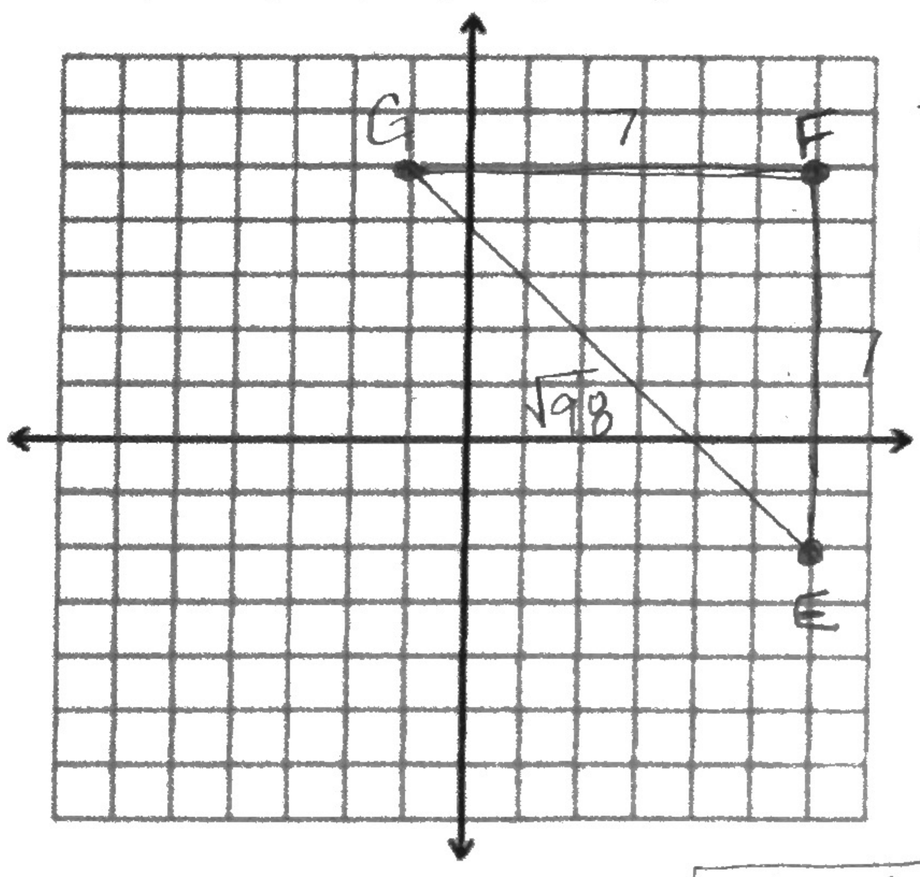
23. $W(5,-1), X(5,6), Y(2,-1), Z(2,6)$



perimeter $= 3 + 7 + 3 + 7 = 20$

area $= l \cdot w = 3 \cdot 7 = 21$

24. $E(6,-2), F(6,5), G(-1,5)$



$7^2 + 7^2 = GE^2$

$49 + 49 = GE^2$

$98 = GE^2$

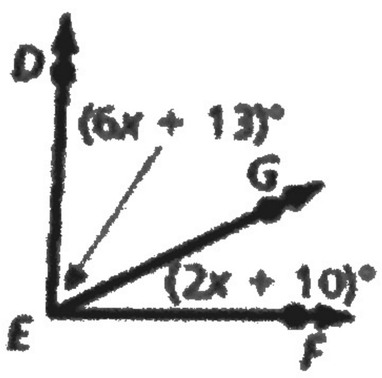
$\sqrt{98} = GE$

perimeter $= \sqrt{98} + 7 + 7 \approx 23.899$

area $= \frac{1}{2}bh = \frac{1}{2}(7)(7) = 24.5$

1.5 Measuring and Constructing Angles

25. Given that $m\angle DEF = 87°$, find $m\angle DEG$ and $m\angle GEF$.



$m\angle DEG + m\angle GEF = m\angle DEF$

$6x+13+2x+10=87$

$8x+23=87$

$-23 \quad -23$

$8x=64$

$\frac{8x}{8} = \frac{64}{8}$

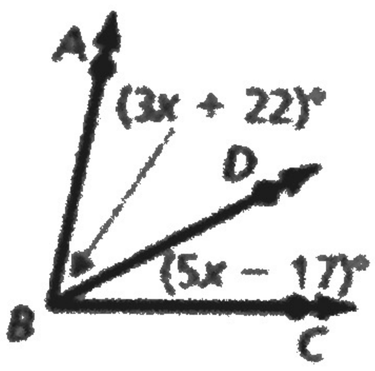
$x=8$

$m\angle DEG = 6(8)+13 = \boxed{61°}$

$m\angle GEF = 2x+10 = 2(8)+10 = \boxed{26°}$

Find $m\angle ABD$ and $m\angle CBD$.

26. $m\angle ABC = 77°$



$m\angle ABC = m\angle ABD + m\angle DBC$

$77 = 3x+22+5x-17$

$77 = 8x+5$

$-5 \quad -5$

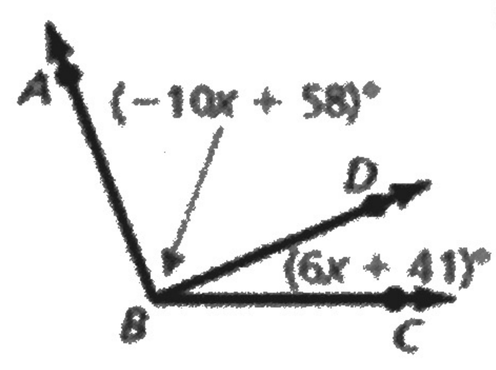
$\frac{72}{8} = \frac{8x}{8}$

$9 = x$

$m\angle ABD = 3(9)+22 = \boxed{49°}$

$m\angle CBD = 5(9)-17 = \boxed{28°}$

27. $m\angle ABC = 111°$



$m\angle ABC = m\angle ABD + m\angle CBD$

$111 = -10x+58+6x+41$

$111 = -4x+99$

$-99 \quad -99$

$\frac{12}{-4} = \frac{-4x}{-4}$

$-3 = x$

$m\angle ABD = -10(-3)+58 = \boxed{88°}$

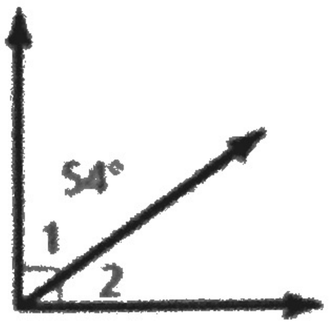
$m\angle CBD = 6(-3)+41 = \boxed{23°}$

28. Find the measure of the angle using a protractor.

$\boxed{127°}$

1.6 Describing Pairs of Angles

29. $\angle 1$ is a complement of $\angle 2$, and $m\angle 1 = 54°$. Find $m\angle 2$.

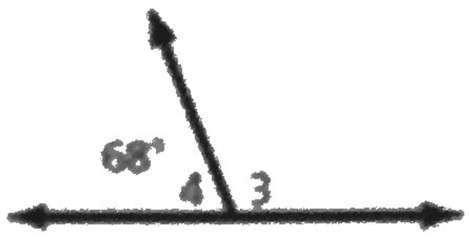


$m\angle 1 + m\angle 2 = 90°$

$54° + m\angle 2 = 90°$

$m\angle 2 = \boxed{36°}$

30. $\angle 3$ is a supplement of $\angle 4$, and $m\angle 4 = 68°$. Find $m\angle 3$.



$m\angle 3 + m\angle 4 = 180°$

$m\angle 3 + 68° = 180°$

$m\angle 3 = \boxed{112°}$

∠1 and ∠2 are complementary angles. Given $m\angle 1$, find $m\angle 2$.

31. $m\angle 1 = 12°$

$m\angle 1 + m\angle 2 = 90°$

$12° + m\angle 2 = 90°$

$m\angle 2 = \boxed{78°}$

32. $m\angle 1 = 83°$

$m\angle 1 + m\angle 2 = 90°$

$83° + m\angle 2 = 90°$

$m\angle 2 = \boxed{7°}$

∠3 and ∠4 are supplementary angles. Given $m\angle 3$, find $m\angle 4$.

33. $m\angle 3 = 116°$

$m\angle 3 + m\angle 4 = 180°$

$116° + m\angle 4 = 180°$

$m\angle 4 = \boxed{64°}$

34. $m\angle 3 = 56°$

$m\angle 3 + m\angle 4 = 180°$

$56° + m\angle 4 = 180°$

$m\angle 4 = \boxed{124°}$