

Geometry Study Guide Ch. 1

1. Given the points $M(2, -9)$ and $N(1, 3)$, what is the midpoint of \overline{MN} ?

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

$$= \left(\frac{2+1}{2}, \frac{-9+3}{2} \right) \rightarrow \left(\frac{3}{2}, \frac{-6}{2} \right) \rightarrow \left(\frac{3}{2}, -3 \right) \text{ or } (1.5, -3)$$

2. Given the points $P(7, -3)$ and $Q(5, 8)$, what is the approximate length of \overline{PQ} ?

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$= \sqrt{(5-7)^2 + (8-(-3))^2}$$

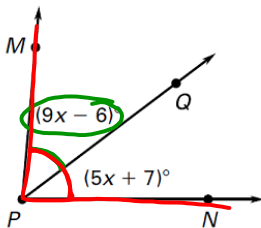
$$= \sqrt{(-2)^2 + (11)^2}$$

$$= \sqrt{4+121}$$

$$= \sqrt{125} \approx 11.18$$

length = distance formula

3. If $m\angle MPN = 80^\circ$, what is $m\angle MPQ$?



$$9x - 6 + 5x + 7 = 80$$

$$14x + 1 = 80$$

$$\underline{-1 \quad -1}$$

$$14x = 79$$

$$\underline{14 \quad 14}$$

$$x \approx 5.64 \approx 5\frac{9}{14}$$

$$\angle MPQ = 9x - 6$$

$$= 9(5.64) - 6$$

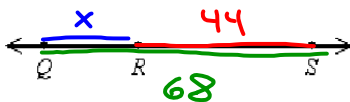
$$\angle MPQ = 44.78$$

$$\angle QPN = 5x + 7$$

$$= 5(5.64) + 7$$

$$= 35.22$$

4. If $RS = 44$ and $QS = 68$, find QR .



$$x = 68 - 44 = 24$$

5. If $\angle 1$ and $\angle 2$ are complementary and $m\angle 1 = 47^\circ$, what is $\angle 2$?

$$\angle 1 + \angle 2 = 90^\circ$$

$$47 + \angle 2 = 90^\circ$$

$$\underline{-47 \quad -47}$$

$$\angle 2 = 43^\circ$$

$$QR + RS = QS$$

$$QR + 44 = 68$$

$$\underline{-44 \quad -44}$$

$$QR = 24$$

6. If $\angle 1$ and $\angle 2$ are supplementary, what are the measures of the angles when $m\angle 1 = (5x - 10)^\circ$ and $m\angle 2 = (3x + 14)^\circ$?

$$\angle 1 + \angle 2 = 180^\circ$$

$$5x - 10 + 3x + 14 = 180$$

$$8x + 4 = 180$$

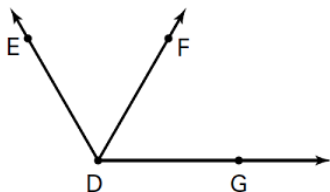
$$8x = 176$$

$$\frac{8x}{8} = \frac{176}{8}$$

$$x = 22$$

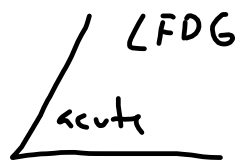
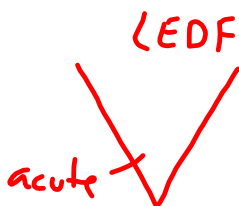
$$\begin{aligned} \angle 1 &= 5x - 10 \\ &= 5(22) - 10 \\ &= 110 - 10 \\ &= 100^\circ \end{aligned}$$

7. Which is a correct name for the angles in the diagram? Describe them.

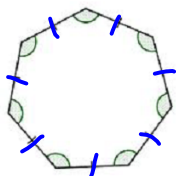


$\angle EDF$ and $\angle FDG$
are adjacent

$$\begin{aligned} \angle 2 &= 3x + 14 \\ &= 3(22) + 14 \\ &= 66 + 14 \\ &= 80^\circ \end{aligned}$$



8. What is the correct classification of the figure?



REGULAR
HEPTAGON

7-heptagon

9. The lengths of two sides of a regular octagon are represented by the expressions $x^2 - 2x + 8$ and $x^2 + 4x - 22$. What is the value of x ?

$$\begin{array}{r} x^2 - 2x + 8 = x^2 + 4x - 22 \\ -x^2 \quad \quad -x^2 \\ \hline -2x + 8 = 4x - 22 \end{array}$$

$$-2x + 8 = 4x - 22$$

$$+2x \quad +2x$$

$$\begin{array}{r} 8 = 6x - 22 \\ +22 \quad +22 \\ \hline 30 = 6x \end{array}$$

$$\begin{array}{r} 30 = 6x \\ 6 \quad 6 \\ \hline 5 = x \end{array}$$

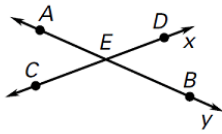
$$\begin{array}{r} x^2 - 2x + 8 = x^2 + 4x - 22 \\ +2x \quad \quad +2x \\ \hline 8 = 6x - 22 \end{array}$$

$$8 = 6x - 22$$

$$+22 \quad +22$$

$$\begin{array}{r} 30 = 6x \quad x = 5 \end{array}$$

10. Based on the figure, be able to name opposite rays, points that are collinear, intersection points, segments, rays and lines.



Opposite Rays

$$\vec{ED} + \vec{EC}$$

$$\vec{EA} + \vec{EB}$$

Collinear

A E B

C E D

Pt of Intersection

E

Segments

\overline{AB} \overline{CD}

Rays

\vec{CE} \vec{CD}
 \vec{AE} \vec{AB}

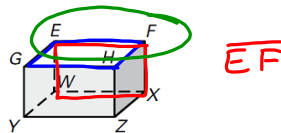
Lines

\leftrightarrow \leftrightarrow
 \overleftrightarrow{AB} \overleftrightarrow{CD}

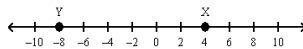
line x

line y

11. What is the intersection of plane HGE and plane FEW?



12. What is the length of \overline{XY} ?



$$4 - -8$$

$$4 + 8$$

$$\textcircled{12}$$

Big - Small

$$|x - y| \text{ or } |y - x|$$

13. $m\angle A$ is 48° greater than $m\angle B$. If $\angle A$ and $\angle B$ are supplementary, find $m\angle A$ and $m\angle B$.

$$\angle 1 + \angle 2 = 180^\circ$$

$$\angle A + \angle B = 180^\circ$$

$$x + 48 + x = 180^\circ$$

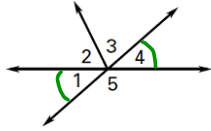
$$2x + 48 = 180^\circ$$

$$\begin{array}{r} -48 \quad -48 \\ \hline 2x = 132 \\ \frac{2x}{2} = \frac{132}{2} \\ x = 66 \end{array}$$

$$\begin{aligned} \angle A &= x + 48 \\ &= 66 + 48 \\ &= 114^\circ \end{aligned}$$

$$\angle B = 66^\circ$$

14. Name a linear pair and a pair of vertical angles in the figure shown.



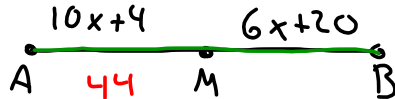
$\angle 4$ and $\angle 5$ $\angle 1$ and $\angle 4$
 $\angle 1$ and $\angle 5$

15. Which of the following is a concave polygon?



has dents

16. Point M is the midpoint of \overline{AB} . If $AM = 10x + 4$ and $MB = 6x + 20$, find the length of \overline{AB} .

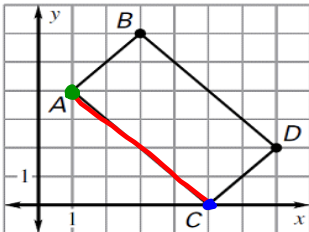


$$\begin{aligned} 10x + 4 &= 6x + 20 \\ -6x &\quad -6x \\ \hline 4x + 4 &= 20 \\ -4 &\quad -4 \\ \hline 4x &= 16 \\ \frac{4}{4} &\quad \frac{4}{4} \\ x &= 4 \end{aligned}$$

$$\begin{aligned} AM &= 10x + 4 \\ &= 10(4) + 4 \\ &= 40 + 4 \\ &= 44 \end{aligned} \qquad \begin{aligned} MB &= 6(4) + 20 \\ &= 24 + 20 \\ &= 44 \end{aligned}$$

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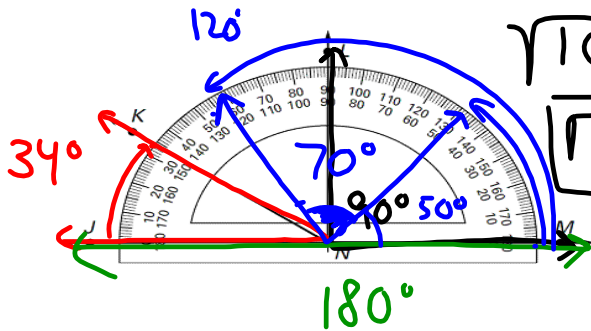
17. Find the length of side AC of ABCD to the nearest hundredth.



A (1, 4) C (5, 0)

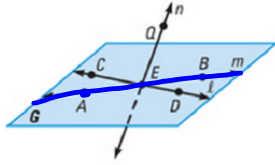
$$\begin{aligned} &\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\ &\sqrt{(1 - 5)^2 + (4 - 0)^2} \\ &\sqrt{(-4)^2 + (4)^2} \end{aligned}$$

18. Use the diagram to find the measure of $\angle JNK$. Then classify the angle.



$$\begin{aligned} &\sqrt{16 + 16} \\ &\sqrt{32} \approx 5.66 \end{aligned}$$

19. a. Point A lies on line m. **T**
 b. Point D lies on line n. **F**
 c. Name four points that are coplanar. **C, E, D, B**
 d. Name 3 points that are collinear. **A, E, B**



20. Be able to classify polygons by the number of sides **and** is it convex or concave.

