

Geometry Fall Practice PBA

Unit 1: Tools of Geometry

- ① $\overleftrightarrow{TQ}, \overleftrightarrow{NT}, \overleftrightarrow{TN}, \overleftrightarrow{QN}, \overleftrightarrow{NQ}$, line m ② RVO, RVS, QVS
- ③ RQS, TQN ④ $R, Q, S, V; RQS, T; R, Q, S, N$
- ⑤ point T and point N ⑥ $\overline{RQ}, \overline{QR}, \overline{QS}, \overline{SQ}, \overline{RS}, \overline{SR}, \overline{NQ}, \overline{QN}, \overline{QT}, \overline{TQ}, \overline{TN}, \overline{NT}$
- ⑦ $\overrightarrow{RO}, \overrightarrow{SR}, \overrightarrow{OS}, \overrightarrow{RS}, \overrightarrow{TO}, \overrightarrow{TN}, \overrightarrow{NT}, \overrightarrow{SQ}, \overrightarrow{RO}, \overrightarrow{QT}, \overrightarrow{NQ}, \dots$
- ⑧ \overrightarrow{QR} and \overrightarrow{QS} ; \overrightarrow{QT} and \overrightarrow{QN}
- ⑨ $\overrightarrow{YX}, \overrightarrow{XR}, \overrightarrow{RX}, \overrightarrow{YR}, \overrightarrow{RY}$ ⑩ \overrightarrow{RX} and \overrightarrow{RY}
- ⑪ \overleftrightarrow{RS} ⑫ $EF + FG = EG$

$$8x - 14 + 4x + 1 = 59$$

$$12x - 13 = 59$$

$$\begin{array}{r} +13 \quad +13 \\ \hline 12x = 72 \end{array}$$

$$\begin{array}{r} 12x = 72 \\ \hline 12 \quad 12 \\ \hline x = 6 \end{array}$$

$$x = 6$$

$$EF = 8(6) - 14$$

$$= 48 - 14$$

$$\boxed{EF = 34}$$

$$FG = 4(6) + 1$$

$$= 24 + 1$$

$$\boxed{FG = 25}$$

⑬ $4x - 20 = 3x + 14$
 $x = 34$

$$m\angle ROS = 4(34) - 20$$

$$\boxed{m\angle ROS = 116}$$

$$\boxed{m\angle TOS = 116}$$

⑭ $LM = MN$
 $3x = 5x - 6$
 $-2x = -6$
 $x = 3$

$$LN = 3(3) + 5(3) - 6$$

$$= 9 + 15 - 6$$

$$\boxed{LN = 18}$$

⑮ $m\angle PMQ = m\angle LMQ - 90$
 $= 120 - 90$

$$\boxed{m\angle PMQ = 30}$$

⑯ $m\angle QMN = m\angle PMN - m\angle PMQ$
 $= 90 - 30$

$$\boxed{m\angle QMN = 60}$$

$$\begin{aligned} (17) \quad M &= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right) \\ &= \left(\frac{7+2}{2}, \frac{5+(-4)}{2} \right) \\ &= \boxed{\left(\frac{9}{2}, \frac{1}{2} \right)} \end{aligned}$$

$$\begin{aligned} (18) \quad d &= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} \\ &= \sqrt{(7-2)^2 + (5-(-4))^2} \\ &= \sqrt{5^2 + 9^2} = \sqrt{25+81} \\ &= \sqrt{106} \approx \boxed{10.3} \end{aligned}$$

Unit 2: Reasoning and Proof

- (1) If the two angles are supplementary, then the sum of the measures of two angles is 180.

True

The sum of the measures of two angles is 180 if and only if the two angles are supplementary.

- (2) If two angles are congruent, then the angles have equal measures.

True

Two angles have equal measures if and only if the angles are congruent.

- (3) Points X, Y, and Z are collinear.

- (4) $\angle XYZ$ is not acute.

- (5) If a line intersects a segment at its midpoint, then it divides the segment into two congruent segments.

- (6) If a polygon is a pentagon, then it has two more sides than a triangle.

$$\begin{aligned} (7) \quad (A) \quad 2x+21 &= 4x \\ 21 &= 2x \\ \boxed{10.5} &= x \end{aligned}$$

$$\begin{aligned} (B) \quad 3x &= 2x+40 \\ \boxed{x} &= 40 \end{aligned}$$

$$(8) \quad m\angle 1 = 90$$

$$m\angle 2 = 50$$

$$m\angle 3 = 40$$

(9) Given: $5(x+3) = -4$
 Prove: $x = -\frac{19}{5}$

Statements	Reasons
① $5(x+3) = -4$	① Given
② $5x + 15 = -4$	② Distributive Property
③ $5x = -19$	③ Subtraction Property of Equality
④ $x = -\frac{19}{5}$	④ Division Property of Equality

Unit 3: Parallel and Perpendicular Lines

① $\overline{CD}, \overline{GH}, \overline{EF}$

② $\overline{BF}, \overline{AE}, \overline{EH}, \overline{FG}$

③ plane ABCD || plane EFGH

④ $\overline{AD}, \overline{EH}, \overline{AG}, \overline{DH}$

plane ABFE || plane DCGH

plane AEHD || plane BFGC

⑤ $\overline{BC}, \overline{EH}, \overline{FG}$

⑥ $\overline{FE} \parallel \overline{CD}$ because skew lines are not parallel, not intersecting, and not coplanar.

⑦ $\overline{CD}, \overline{CB}, \overline{GH}, \overline{GF}$

⑧ $\overline{AB}, \overline{BF}, \overline{EF}, \overline{AE}$

⑨ $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 6$, $\angle 5$ and $\angle 6$, $\angle 2$ and $\angle 5$

⑩ $\angle 1$ and $\angle 4$, $\angle 2$ and $\angle 6$, $\angle 3$ and $\angle 5$, $\angle 8$ and $\angle 9$

⑪ $\angle 6$ and $\angle 8$, $\angle 1$ and $\angle 2$

⑫ $\angle 4$ and $\angle 5$, $\angle 3$ and $\angle 8$, $\angle 5$ and $\angle 9$, $\angle 1$ and $\angle 3$, $\angle 7$ and $\angle 8$

⑬ $\angle 4$ and $\angle 7$, $\angle 5$ and $\angle 8$, $\angle 1$ and $\angle 5$, $\angle 7$ and $\angle 9$

⑭ $\angle 4$ and $\angle 3$, $\angle 3$ and $\angle 9$, $\angle 3$ and $\angle 4$

⑮ none

⑯ $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 6$, $\angle 5$ and $\angle 6$, $\angle 2$ and $\angle 5$

③

(17) $m\angle 1 = 75^\circ$ (Corresponding \angle 's Thrm)
 $m\angle 2 = 105^\circ$ (Linear Pair Postulate)

(18) $m\angle 1 = 120^\circ$ (Corresponding \angle 's Thrm)
 $m\angle 2 = 60^\circ$ (Same-Side Int. \angle 's Postulate)

(19) $m\angle 1 = 100^\circ$ (Same-Side Int. \angle 's Postulate)
 $m\angle 2 = 70^\circ$ (Alt. Int. \angle 's Thrm)

(20) $x + x - 50 = 180$
 $2x - 50 = 180$
 $2x = 230$
 $x = 115$

(21) $3x - 10 = x + 40$
 $2x = 50$
 $x = 25$

(22) $5x + 4x = 186$
 $9x = 180$
 $x = 20$

(23) $3p - 6 = 90$
 $3p = 96$
 $p = 32$

(24) $3y + y = 180$
 $4y = 180$
 $y = 45$

$x = 135$

(25) Given: $j \parallel k, \angle 9 \cong \angle 5$ * many different methods
 Prove: $l \parallel n$

Statements	Reasons
① $j \parallel k, \angle 9 \cong \angle 5$	① Given
② $\angle 9 \cong \angle 1$	② Corresponding Angles Thrm
③ $\angle 5 \cong \angle 1$	③ Transitive Property of \cong
④ $l \parallel n$	④ Converse of the Corresponding Angles Thrm

(26) $a = 67$
 $b = 58$
 $c = 125$
 $d = 23$
 $e = 90$

(27) $3x + 10 = 25 + x + 15$
 $3x + 10 = x + 40$
 $2x = 30$
 $x = 15$

$3(15) + 10 = 35$
 $180 - 35 = 145$

$$(22) m_{e1} = \frac{-2 - (-4)}{0 - 4} = \frac{2}{-4} = -\frac{1}{2}$$

$$m_{e2} = \frac{1 - (-5)}{4 - 1} = \frac{6}{3} = \frac{2}{1}$$

perpendicular

$$l_1: y + 2 = -\frac{1}{2}(x - 0)$$

$$\text{or } y + 4 = -\frac{1}{2}(x - 4)$$

$$\text{or } y = -\frac{1}{2}x - 2$$

$$l_2: y - 1 = 2(x - 4)$$

$$\text{or } y + 5 = 2(x - 1)$$

$$\text{or } y = 2x - 7$$

$$(23) m_{e1} = \frac{4 - (-2)}{-3 - 1} = \frac{6}{-4} = -\frac{3}{2}$$

$$m_{e2} = \frac{0 - 4}{-4 - 2} = \frac{-4}{-6} = \frac{2}{3}$$

perpendicular

$$l_1: y - 4 = -\frac{3}{2}(x + 3)$$

$$\text{or } y + 2 = -\frac{3}{2}(x - 1)$$

$$\text{or } y = -\frac{3}{2}x - \frac{1}{2}$$

$$l_2: y - 0 = \frac{2}{3}(x + 4)$$

$$\text{or } y - 4 = \frac{2}{3}(x - 2)$$

$$\text{or } y = \frac{2}{3}x + 2\frac{2}{3}$$

$$(24) m_{e1} = \frac{5 - 1}{-2 - (-3)} = \frac{4}{1}$$

$$m_{e2} = \frac{-2 - 2}{0 - 1} = \frac{-4}{-1} = \frac{4}{1}$$

parallel

$$l_1: y - 5 = 4(x + 2)$$

$$\text{or } y - 1 = 4(x + 3)$$

$$\text{or } y = 4x + 13$$

$$l_2: y + 2 = 4(x - 0)$$

$$\text{or } y - 2 = 4(x - 1)$$

$$\text{or } y = 4x - 2$$

Unit 4: Congruent Triangles

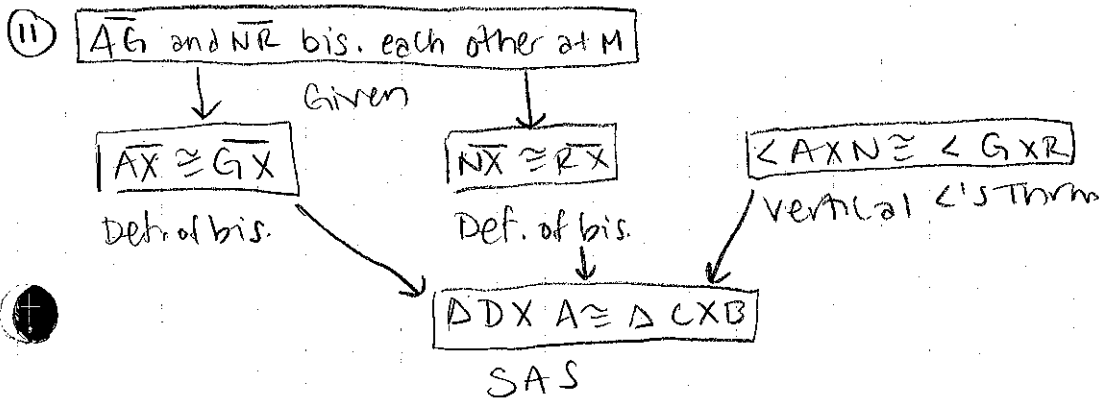
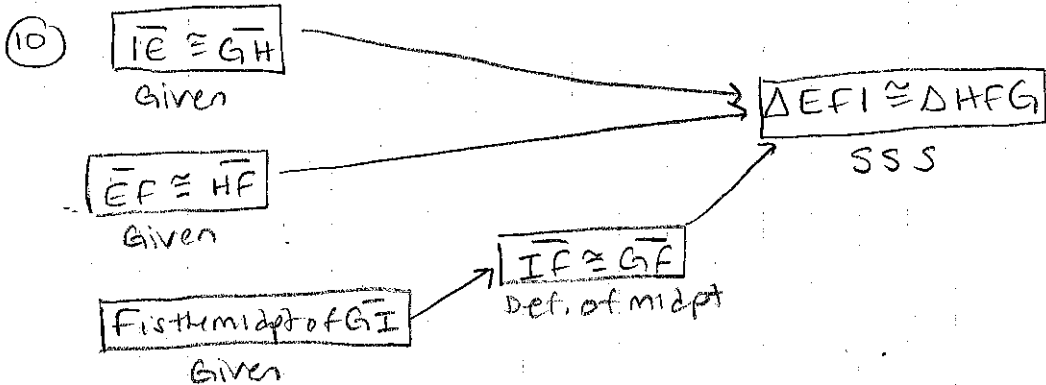
- ① $\overline{PS} \cong \overline{RQ}$ ② $\overline{QP} \cong \overline{SR}$ ③ $\overline{PR} \cong \overline{RP}$
 ④ $\angle Q \cong \angle S$ ⑤ $\angle QPR \cong \angle SRP$ ⑥ $\angle SPR \cong \angle QRP$

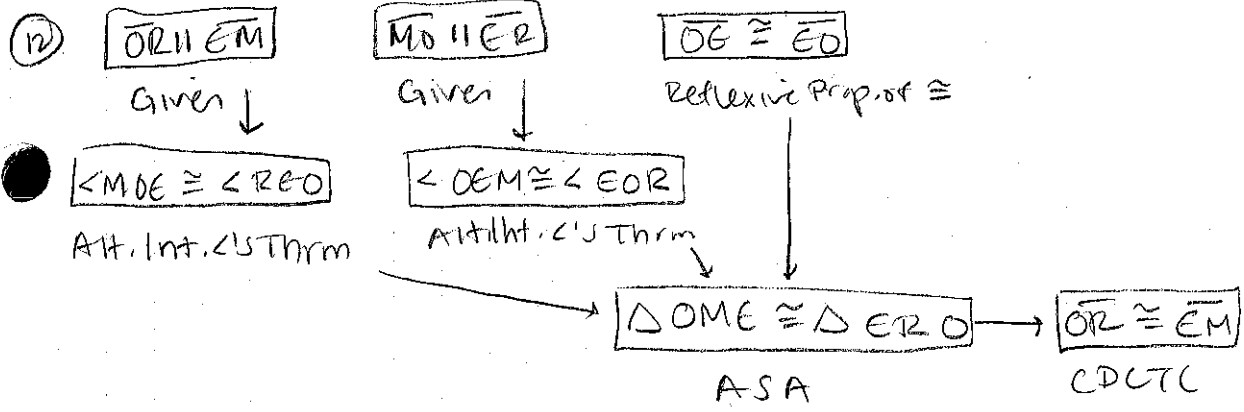
- 7) (A) not enough information (B) ASA (C) SSS (D) SAS
 (E) AAS (F) SAS (G) AAS (H) SAS (I) HL
 (J) not enough information (K) ASA (L) SSS

- 8) (A) $x = 80$ (B) $x = 38$ (C) $x = 40$
 $y = 40$ $y = 4$ $y = 70$

- (D) $m = 20$ (E) $m = 36$ (F) $m = 60$
 $n = 45$ $n = 27$ $n = 30$

- 9) $a = 37$ $d = 58$ $g = 48$ $m = 26$ $s = 69$
 $b = 143$ $e = 37$ $h = 84$ $p = 69$
 $c = 37$ $f = 53$ $k = 96$ $r = 111$





Unit 5: Relationship Within Triangles

- ① $BE = 12$
 $AF = 12$
 $CE = 8$
 $DA = 16$

$\Delta ADF = 16 + 24 + 12 = \boxed{52}$

② (A) $x + 5 = 2x - 7$
 $\boxed{12 = x}$

(B) $5y = 3y + 6$
 $2y = 6$
 $\boxed{y = 3}$

③ (A) $TY = 18$
 $TW = 27$

(B) $ZY = 4.5$
 $ZU = 13.5$

(C) $VY = 6$
 $YX = 3$

④ $8 + 12 > x$
 $20 > x$

⑤ $5 + 16 > x$
 $21 > x$

⑥ $6 + 6 > x$
 $12 > x$

$8 + x > 12$
 $x > 4$

$5 + x > 16$
 $x > 11$

$6 + x > 6$
 $x > 0$

$\boxed{4 < x < 20}$

$\boxed{11 < x < 21}$

$\boxed{0 < x < 12}$

⑦ $18 + 23 > x$
 $41 > x$

⑧ $4 + 7 > x$
 $11 > x$

⑨ $20 + 35 > x$
 $55 > x$

$18 + x > 23$
 $x > 5$

$4 + x > 7$
 $x > 3$

$20 + x > 35$
 $x > 15$

$\boxed{5 < x < 41}$

$\boxed{3 < x < 11}$

$\boxed{15 < x < 55}$