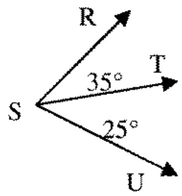
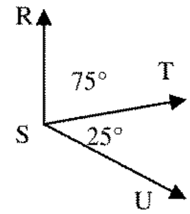
Midterm Review Solutions

1. Diagram Illustrating Conjecture

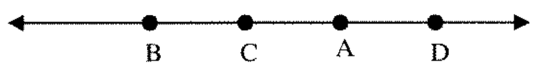


Counter Example



2. Deductive

3. Diagram



4. $AB = 2\sqrt{10}$

5. False

6. A

7. $A = 113.04 \text{ units}^2$
   $C = 37.68 \text{ units}$

8. **CONVERSE**: If a ray divides an angles into two congruent angles, then the ray bisects the angle
   True
   TRUE BICONDITIONAL: A ray divides an angle in to two congruent angles if and only if the ray bisects the angle

9.

STATEMENT	REASON
$m\angle 1 = m\angle 3$	Given
$m\angle 1 + m\angle 2 = m\angle 3 = m\angle 2$	Addition Property of Equality
$m\angle 1 + m\angle 2 = m\angle AFC$ and $m\angle 3 + m\angle 2 = m\angle DFB$	Angle Addition Property
$m\angle AFC = m\angle DFB$	Substitution

10.

STATEMENT	REASON
$1 \perp n$, $m \perp n$, and $\angle ABJ \cong KHL$	Given
$\angle ABJ$ is a right angles	Def. of perpendicular lines
$\angle DCH$ is a right angles	Def. of perpendicular lines
$\angle ABJ \cong \angle DCH$	All right angles are congruent
$\angle DCH \cong \angle KHL$	Substitution/ Transitive Property of =

11. $MNV \parallel TPQ$, $MNO \parallel LVU$ (answers will vary, two examples are given; Just remember when you are naming a plane use at least 3 letters

12. Skew lines are lines that to not lie in the same plane and do not intersect

13. $\overline{AC} \cong \overline{BD}$ → $AC = BD$ → $AB + BC = BC + CD$

Given — *Def of congruent segments* — *Substitution*

$\overline{AC} \cong \overline{BD}$
Segment Addition

$\overline{AC} \cong \overline{BD}$
Segment Addition

↓ $AB = CD$
Subtraction

↓ $\overline{AB} \cong \overline{CD}$
Def. congruent segments.

14. $\angle HBF$ and $\angle AED$ are alternate exterior angles

15. $n \parallel p$

16. A

17. B

18. 127°

19. Equilateral; $\overline{AB} \cong \overline{CA} \cong \overline{BC}$

20. All are possible

21. A

22.

STATEMENT	REASON
$\overline{BC} \cong \overline{DA}$ and $\angle 1 \cong \angle 2$	Given
$\angle BEC \cong \angle DEA$	Vertical Angles are congruent
$\triangle BEC \cong \triangle DEA$	AAS
$\overline{BE} \cong \overline{DE}$ and $\overline{AE} \cong \overline{CE}$	CPCTC
$\angle BEA \cong \angle DEC$	Vertical angles congruent
$\triangle BEA \cong \triangle DEC$	SAS

23.

STATEMENT	REASON
$\overline{QO} \cong \overline{QN}$	Given
$\angle QNO \cong \angle QON$	Base angles theorem
$\angle QNM \cong \angle QOP$	Congruent supplements
$\overline{NM} \cong \overline{QN}$	Given
$\triangle QNM \cong \triangle QOP$	SAS
$\overline{QM} \cong \overline{QP}$	CPCTC
$\triangle QMP$ is isosceles	Def isosceles triangle

24. C

25. B

26. The lengths of the diagonals are $\sqrt{a^2+(-a)^2}=a\sqrt{2}$ and $\sqrt{a^2+(-a)^2}=a\sqrt{2}$, so they are congruent. The slopes are $\frac{a}{-a}=-1$ and $\frac{a}{-a}=1$. Since slopes are negative reciprocals the diagonals are perpendicular.

27. $LO=4$, $MN=6$; $\overleftrightarrow{NO}$ is the perpendicular bisector of $\overline{LM}$ therefore $\overleftrightarrow{NO}$ cuts $\overline{LM}$ into two congruent segments. $\overline{LO}\cong\overline{MO}$ if $\overline{MO}=4$ then $\overline{LO}=4$. Also by the perpendicular bisector theorem, a point on the perpendicular bisector is equidistant from the endpoints of the segment; therefore $\overline{LN}\cong\overline{NM}$. $\overline{LN}=6$ so $\overline{NM}=6$

28. Circumcenter
NOTE: medians meet at the centroid, altitudes meets at the orthocenter, and angle bisectors meet at the incenter.

29. $RS=8$, $UT=5$

30. SKIP

31. $\overline{BF}$
NOTE: Altitude: $\overline{BD}$; Perpendicular Bisector: $\overline{FG}$; Angle Bisector: $\overline{BE}$

32. D

33. Right Triangle

34. D

35. C Note: The largest angle is across from the longest side, and the smallest angle is across from the shortest side

36. A Equations to find solutions. $x<14+28$ and $x+14>28$: solve both equations for x
NOTE: to form a triangle the sum of the two shortest sides must be larger than the longest side.

37. C

38. 5

39. $x=108$, $y=72$

40. (be sure to mark your picture)
   a. $m\angle FJH=112^\circ$
   b. $JF=19$
   c. $m\angle GFJ=68^\circ$
   d. $FG=34$

41. proof

42. Rectangle

43. D

44. $8y+5=10y+4$

$$1=2y$$

$$\frac{1}{2}=y$$

45. Isosceles trapezoid

46. $\frac{1}{2}(x+33)=27$

$$x+33=54$$

$$x=21$$

47. A

48. $A=294cm^2$

49. The formula to find the area of a parallelogram is $A=bh$. The height is not given in the picture, but you know that the height is perpendicular to base AD, and therefore $\triangle ABE$ is a right triangle. Use the Pythagorean Theorem $a^2+b^2=c^2$ to find the height.
    a. Height $BE=5\sqrt{5}$
    b. $A=160\sqrt{5}$

50. Area of trapezoid on the left

$$A_1=\frac{1}{2}h(b_1+b_2)$$

$$A_1=\frac{1}{2}(15)(6+26)$$

$$A_1=240units^2$$

Area of trapezoid on the right

$$A_2=\frac{1}{2}h(b_1+b_2)$$

$$A_2=\frac{1}{2}(14)(13+26)$$

$$A_2=273units^2$$

TOTAL AREA

$$A_{Total}=A_1+A_2$$

$$A_{Total}=240+273$$

$$A_{Total}=513units^2$$