

Name: Answer Key  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

List the properties of the following figures:

a) parallelogram

- Opposite sides parallel
- Opp. sides =
- Opp.  $\angle$ s =
- Cons.  $\angle$ s supplementary
- Diagonals bisect each other

b) rectangle-properties of a parallelogram +

- Definition: quadrilateral w/ 4 rt.  $\angle$ s
- Diagonals are  $\cong$

c) rhombus-properties of a parallelogram +

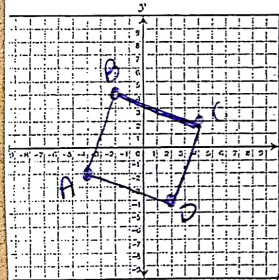
- Definition: quad. w/ 4  $\cong$  sides
- Diagonals are  $\perp$
- Diagonals bisect opp.  $\angle$ s

d) square

- All properties of a rectangle and rhombus.

Use the diagonals to determine if the parallelogram is a rectangle, rhombus, or square.

A(-4, -2) B(-2, 4) C(4, 2) D(2, -4)



$$AC = \sqrt{(4 - (-4))^2 + (2 - (-2))^2}$$

$$= \sqrt{64 + 16} = \sqrt{80}$$

$$BD = \sqrt{(2 - (-2))^2 + (-4 - 4)^2}$$

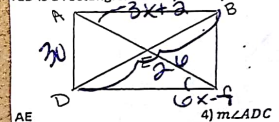
$$= \sqrt{16 + 64} = \sqrt{80}$$

$$\text{slope of } AC = \frac{2 - (-2)}{4 - (-4)} = \frac{4}{8} = \frac{1}{2}$$

$$\text{slope of } BD = \frac{-4 - 4}{2 - (-2)} = \frac{-8}{4} = -2$$

ABCD is a square b/c diagonals are  $\perp$

ABCD is a rectangle. AD=30, DB=26,  $m\angle BAE = (3x+2)$ ,  $m\angle DCE = (6x-7)$ . Find each of the following measures.



1)  $m\angle ADC$  13

4)  $m\angle ADC$  90°

5)  $m\angle BAE$

$$3x + 2 = 6x - 7$$

$$9 = 3x$$

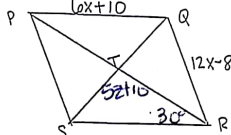
$$x = 3$$

$$m\angle BAE = 3(3) + 2$$

$$= 11°$$

6) BC 30

PQRS is a rhombus. The  $m\angle STR = 5z + 10$  and the  $m\angle TRS = 30°$ . Find each of the following measures.



$$5z + 10 = 90$$

$$5z = 80$$

$z = 16$

$$6x + 10 = 12x - 8$$

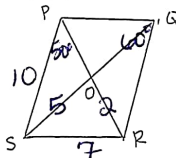
$$18 = 6x$$

$x = 3$

$$6(3) + 10 = 28$$

$m\angle SRO = 60°$

Quadrilateral PQRS is a parallelogram. PS=10, SR=7, OS=5, OR=2,  $m\angle PQR = 60°$ ,  $m\angle SPR = 50°$ . Find each of the following measures.



11) QR 10

12) PQ 7

13) QS 10

14) OP 2

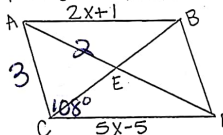
15)  $m\angle PSR$  60°

16)  $m\angle QPS$  120°

17)  $m\angle QRP$  50°

18)  $m\angle RPQ$  70°

ABCD is a parallelogram. AC=3, AE=2,  $m\angle ACD = 108°$ . Find each of the following measures.



19)  $m\angle BDC$  72°

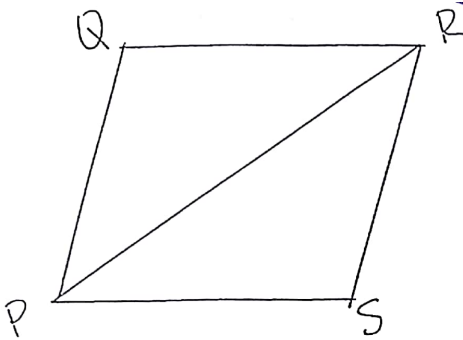
20) AB 5

21)  $m\angle BAC$  72°

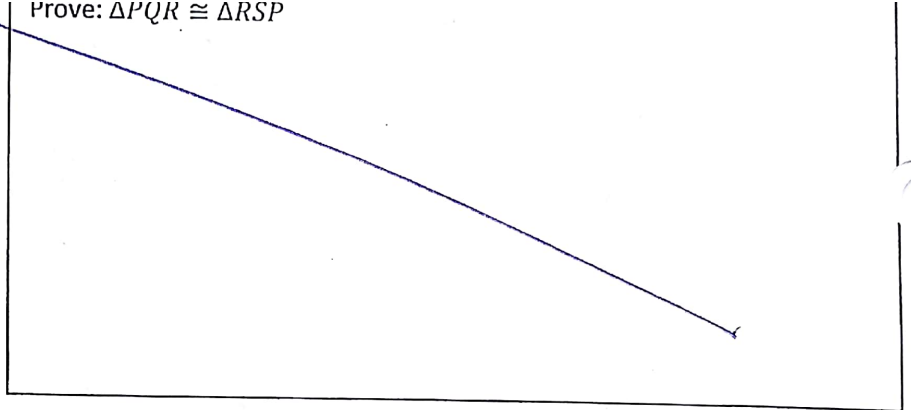
22) DE 2

23) BD 3

24)  $m\angle ABD$  108°

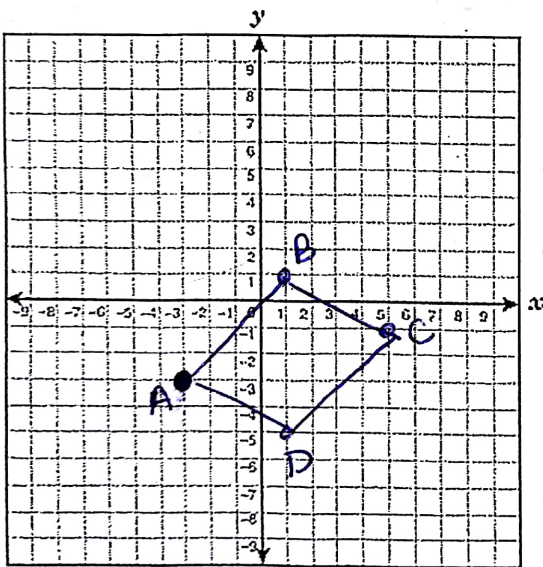


Prove:  $\triangle PQR \cong \triangle RSP$



27. Prove the following quadrilateral with vertices  $A(-3, -3)$   $B(1, 1)$   $C(5, -1)$  and  $D(1, -5)$  is a parallelogram

\* you may use any of the 4 methods.



Midpt:

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

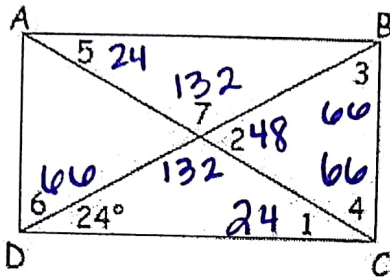
$$BD = \left( \frac{1+1}{2}, \frac{1+(-5)}{2} \right) = (1, -2) \checkmark$$

ABCD is a  $\square$  b/c  
diagonals bisect each  
other

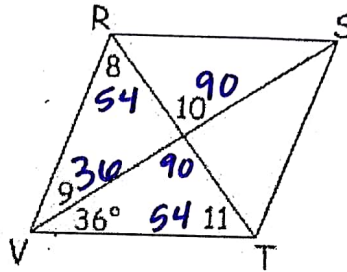
For 18-21, find the measure of the numbered angles in the figures.

- $m\angle 1 = 24^\circ$
- $m\angle 2 = 48^\circ$
- $m\angle 3 = 66^\circ$
- $m\angle 4 = 66^\circ$
- $m\angle 5 = 24^\circ$
- $m\angle 6 = 66^\circ$
- $m\angle 7 = 132^\circ$
- $m\angle 8 = 54^\circ$
- $m\angle 9 = 36^\circ$
- $m\angle 10 = 90^\circ$
- $m\angle 11 = 54^\circ$
- $m\angle 12 = 45^\circ$

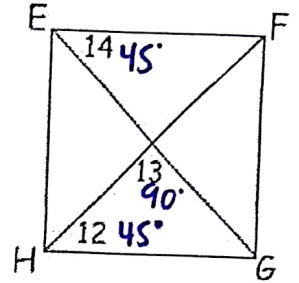
18. ABCD is rectangle



19. RSTV is a rhombus

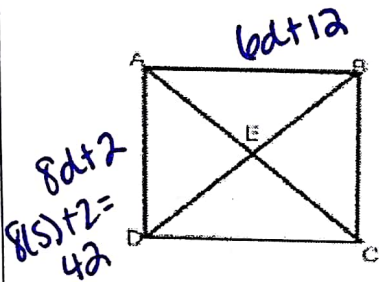


20. EFGH is a square



$m\angle 13 = 90^\circ$   
 $m\angle 14 = 45^\circ$

Use square ABCD to find the following.



$8d+2 = 6d+12$   
 $2d = 10$   
 $d = 5$

2.  $m\angle AEB = 10x - 5$ , solve for  $x$ .

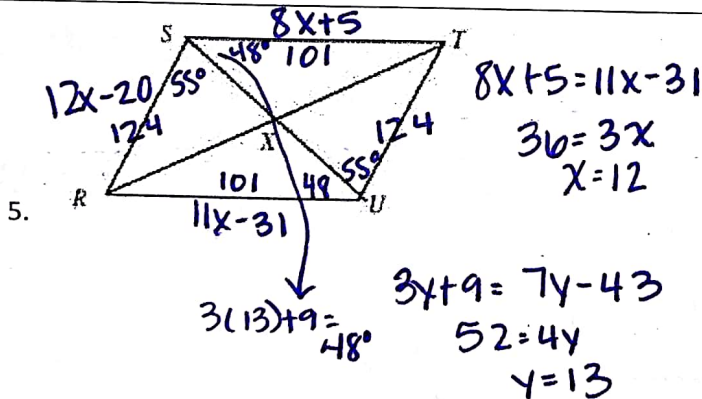
$10x - 5 = 90$   
 $10x = 95$   
 $x = 9.5$

3.  $AD = 8d + 2$ ,  $AB = 6d + 12$ , find the perimeter.

$4 \times 42 = 168$

4.  $AE = 2m + 5$ ,  $DB = 6m + 2$ , find DE.

$2(2m+5) = 6m+2$   
 $4m+10 = 6m+2$   
 $8 = 2m$   
 $m = 4$   
 $DE = 2(4) + 5 = 13$



$8x+5 = 11x-31$   
 $36 = 3x$   
 $x = 12$

$3(12)+9 = 48$   
 $3y+9 = 7y-43$   
 $52 = 4y$   
 $y = 13$

RSTU is a parallelogram.

5.  $ST = 8x + 5$ ,  $RU = 11x - 31$ ,  $SR = 12x - 20$ . Find the perimeter.

$101 + 101 + 124 + 124 = 450$

6.  $m\angle TSU = 3y + 9$ ,  $m\angle SUR = 7y - 43$ ,  $m\angle SXT = 6y + 9$ ,  $m\angle USR = 55^\circ$  solve for  $y$ , then find

$m\angle SRU = 77^\circ$ ,  $m\angle RUT = 103^\circ$   
 $m\angle STU = 77^\circ$ ,  $m\angle SXT = 87^\circ$

$6(13)+9 = 87$   
 $78+9 = 87$

7. To prove segments are congruent what formula must be used?

Distance

8. To prove segments are parallel, what formula must be used?

Slope

9. Slopes of parallel lines are  $\approx$

10. To prove segments are perpendicular, what formula must be used?

Slope

11. Slopes of perpendicular lines are Opp. reciprocals.

12. Use the diagonals to determine whether a parallelogram with the given vertices is a rectangle, rhombus or square. Give all names that apply. Be sure to label everything.

M(-4,5) N(1,7) P(3,2) Q(-2,0)

$$MP = \sqrt{(3 - (-4))^2 + (2 - 5)^2}$$
$$= \sqrt{49 + 9} = \sqrt{58} \checkmark$$

$$NQ = \sqrt{(-2 - 1)^2 + (0 - 7)^2} \text{ rect.}$$
$$= \sqrt{9 + 49} = \sqrt{58} \checkmark$$

$$\text{slope } MP = \frac{2 - 5}{3 - (-4)} = \frac{-3}{7}$$

$$\text{slope } NQ = \frac{0 - 7}{-2 - 1} = \frac{-7}{-3} = \frac{7}{3} \checkmark$$

rhombus

MNPQ is a square  
b/c diag. are  $\approx$   $\perp$

