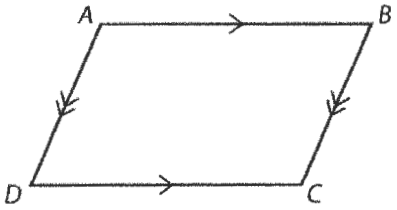
Name _____ Date _____ Period _____

Unit 3 Review

Use the figure for 1–3. ABCD is a Parallelogram.



1. $\overline{AB}$ is congruent to what other segment?

$\overline{CD}$

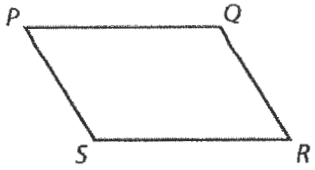
2. $\angle D$ is congruent to what other angle?

$\angle B$

3. $\angle D$ is supplementary to what other angles?

$\angle A$ & $\angle C$

Use parallelogram *PQRS* for 4–6.



4. If $m\angle P = 2x°$, $m\angle R = (x + 31)°$, find the value for x.

$2x = x + 31$

$x = 31$

5. Using your answer from problem 4, find the measure of all four angles.

$m\angle P = 2(31) = 62$ $m\angle Q = 180 - 62 = 118$

$m\angle R = 62$ $m\angle S = 118$

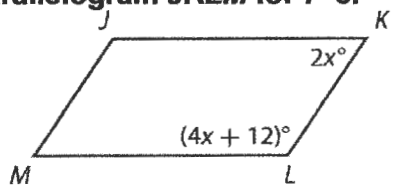
6. If $QR = 16$ and $PS = 3y - 5$, find the value for y.

$3y - 5 = 16$

$3y = 21$

$y = 7$

Use parallelogram *JKLM* for 7–8.



7. What is the value of x?

$4x + 12 + 2x = 180$

$6x + 12 = 180$

$6x = 168$

$x = 28$

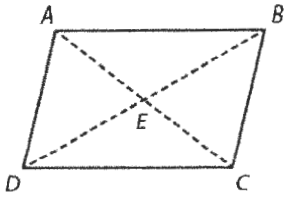
8. What are the measures of all the interior angles of the parallelogram?

$m\angle K = 2(28) = 56$ $m\angle L = 4(28) + 12 = 124$

$m\angle M = 56$ $m\angle J = 124$

Use the following information for 9–13.

In parallelogram *CDEF*, $AE = 3x + 4$, $EC = 2x + 8$, $BE = 4y + 1$, and $BD = 18$.



9. What is the value of x?

$3x + 4 = 2x + 8$

$x = 4$

10. What is the value of y?

$BD = 18 \rightarrow BE = 9$

$4y + 1 = 9$

$4y = 8$

$y = 2$

11. What is the length of $\overline{EC}$?

$EC = 2(4) + 8 = 16$

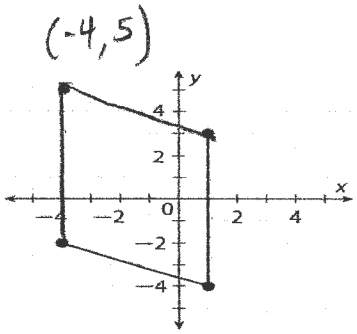
12. What is the length of $\overline{AC}$?

$AC = 2(16) = 32$

13. What is the length of $\overline{ED}$?

$ED = BE = 9$

14. Three vertices of a quadrilateral are shown. What is the location of the fourth vertex so that it is a parallelogram?



For Problems 15-16, use the table below. A city block is a quadrilateral bounded by four streets with given equations.

Street	Equation
Blue St.	$y = 3x - 4$
Red St.	$y = -\frac{1}{3}x + 6$
Yellow St.	$3x - y = 10$
Green St.	$2x + 6y = 18$

slope = 3

slope = $-\frac{1}{3}$

$\frac{-y}{-1} = \frac{-3x}{-1} + \frac{10}{-1} \rightarrow y = 3x - 10 \rightarrow$ slope = 3

$\frac{6y}{6} = \frac{-2x}{6} + \frac{18}{6} \rightarrow y = -\frac{1}{3}x + 3 \rightarrow$ slope = $-\frac{1}{3}$

15. Is the block a parallelogram? Explain your reasoning.

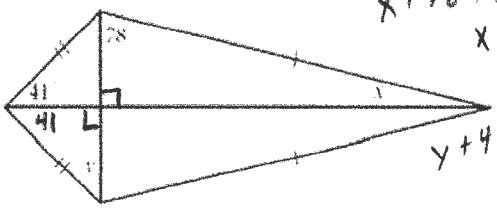
yes, two pairs of equal slopes

16. Is the block a rectangle? Explain your reasoning.

yes, 3 and $-\frac{1}{3}$ are opp. recip. so the sides are perp.

17. Solve for the variables in the kites:

$x =$ 12, $y =$ 49



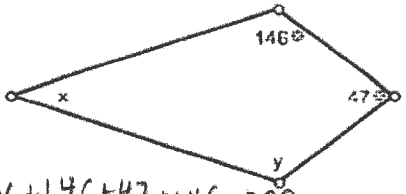
$x + 78 + 90 = 180$

$x = 12$

$y + 41 + 90 = 180$

$y = 49$

$x =$ 21, $y =$ 146



$x + 146 + 47 + 146 = 360$

$x + 339 = 360$

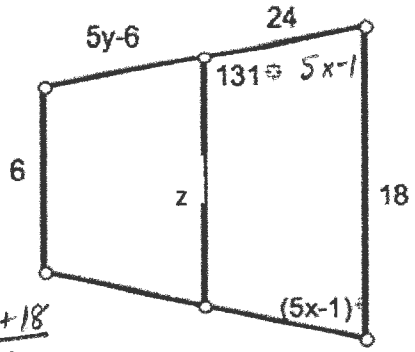
$x = 21$

18. Solve for the variables in the isosceles trapezoid with the midsegment drawn in:

x = 10

y = 6

z = 12



$5x - 1 + 131 = 180$

$5x + 130 = 180$

$5x = 50$

$x = 10$

$5y - 6 = 24$

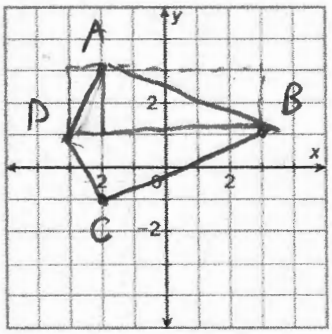
$5y = 30$

$y = 6$

$z = \frac{6 + 18}{2}$

$= \frac{24}{2} = 12$

19. A quadrilateral has vertices $A(-2, 3)$, $B(3, 1)$, $C(-2, -1)$, and $D(-3, 1)$. Graph the points, identify the shape, and find the perimeter and area, rounding to the nearest tenth. **All work must be shown.**



Shape: kite

Perimeter = 15.2

Area= 12

AD
$2^2+1^2=x^2$
$4+1=x^2$
$5=x^2$
$x=\sqrt{5}=2.2$

AB
$5^2+2^2=x^2$
$25+4=x^2$
$29=x^2$
$x=\sqrt{29}=5.4$

$P=2.2+2.2+5.4+5.4=15.2$

$\triangle ADB$
$Area=\frac{1}{2}(6)(2)=6$

$Total\ Area=6\cdot 2=12$

20. Find each side length in the polygon below, then find the area and perimeter. Round all answers to the nearest tenth. **All work must be shown.**

Side lengths:

AB = 6

BC = 5

CD = 3.6

DE = 8

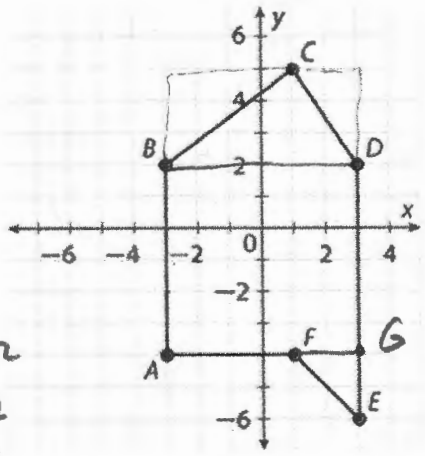
EF = 2.8

FA= 4

$3^2+4^2=x^2$
$9+16=x^2$
$25=x^2$
$x=\sqrt{25}=5$

$2^2+3^2=x^2$
$4+9=x^2$
$13=x^2$
$x=\sqrt{13}=3.6$

$2^2+2^2=x^2$
$4+4=x^2$
$8=x^2$
$x=\sqrt{8}=2.8$



Perimeter = 29.4

$P=6+5+3.6+8+2.8+4=29.4$

Area = 47

$\triangle BCD$
$Area=\frac{1}{2}(6)(3)=9$

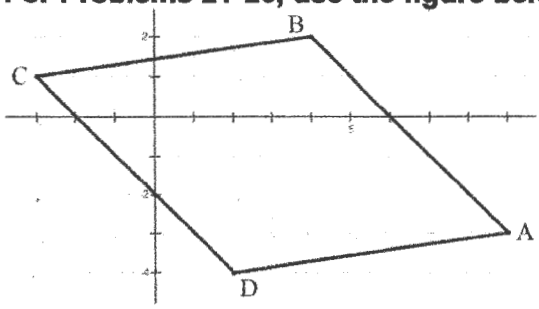
$ABDG$
$Area=6\cdot 6=36$

$\triangle EFG$
$Area=\frac{1}{2}(2)(2)=2$

$Total\ Area=9+36+2=47$

Slope: $m=\frac{y_2-y_1}{x_2-x_1}$ **Distance:** $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ **Midpoint:** $\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$ **Area: Triangle** $A=\frac{bh}{2}$ **Rectangle** $A=bh$

For Problems 21-26, use the figure below.



21. Calculate the following slopes. Note that some segments are not drawn in the figure.

Slope $\overline{BA}$ = $\frac{-5}{5} = -1$

Slope $\overline{DA}$ = $\frac{1}{7}$

Slope $\overline{CD}$ = $\frac{-5}{5} = -1$

Slope $\overline{CB}$ = $\frac{1}{7}$

Slope $\overline{DB}$ = $\frac{6}{2} = 3$

Slope $\overline{CA}$ = $\frac{-4}{12} = -\frac{1}{3}$

22. Calculate the following slopes. Note that some segments are not drawn in the figure.

Length $\overline{BA}$ = $\sqrt{50}$

$5^2+5^2=x^2$

$25+25=x^2$ → $x^2=50$

Length $\overline{DA}$ = $\sqrt{50}$

$1^2+7^2=x^2$

$1+49=x^2$ → $x^2=50$

Length $\overline{CA}$ = $\sqrt{160}$

$4^2+12^2=x^2$

$16+144=x^2$ → $x^2=160$

Length $\overline{DB}$ = $\sqrt{40}$

$6^2+2^2=x^2$

$36+4=x^2$ → $x^2=40$

23. Using your calculations in Problems 21 and 22, explain how you know that the figure is a parallelogram.

two pairs of equal slopes

24. Is the figure a rectangle? Use your calculations in Problems 21 and 22 to support your answer.

no, -1 and $\frac{1}{7}$ are not perp. slopes

or diag. not same length

25. Is the figure a rhombus? Use your calculations in Problems 21 and 22 to support your answer.

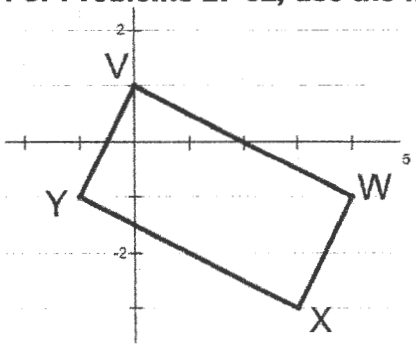
yes, all sides have length of $\sqrt{50}$

or 3 and $\frac{1}{3}$ are perp. slopes

26. Is the figure a square? Explain how you came to that conclusion.

no, not a rectangle so can't be a square

For Problems 27-32, use the figure below.



27. Calculate the following slopes. Note that some segments are not drawn in the figure.

Slope $\overline{VW}$ = $\frac{-2}{4} = \frac{-1}{2}$

Slope $\overline{XW}$ = $\frac{2}{1} = 2$

Slope $\overline{YX}$ = $\frac{-2}{4} = \frac{-1}{2}$

Slope $\overline{YV}$ = $\frac{2}{1} = 2$

Slope $\overline{YW}$ = $\frac{0}{5} = 0$

Slope $\overline{VX}$ = $\frac{-4}{3}$

28. Calculate the following slopes. Note that some segments are not drawn in the figure.

Length $\overline{VW}$ = $\sqrt{20}$

$2^2 + 4^2 = x^2$

$4 + 16 = x^2 \rightarrow x^2 = 20$

Length $\overline{YV}$ = $\sqrt{5}$

$2^2 + 1^2 = x^2$

$4 + 1 = x^2 \rightarrow x^2 = 5$

Length $\overline{YW}$ = 5

Length $\overline{VX}$ = 5

$4^2 + 3^2 = x^2$

$16 + 9 = x^2 \rightarrow x^2 = 25$

29. Using your calculations in Problems 27 and 28, explain how you know that the figure is a parallelogram.

two pairs of equal slopes

30. Is the figure a rectangle? Use your calculations in Problems 27 and 28 to support your answer.

yes, $\frac{-1}{2}$ and 2 are perp. slopes

or diag are same length

31. Is the figure a rhombus? Use your calculations in Problems 27 and 28 to support your answer.

no, sides are diff. length

or 0 and $\frac{-4}{3}$ not perp. slopes

32. Is the figure a square? Explain how you came to that conclusion.

no, not a rhombus so can't be a square