

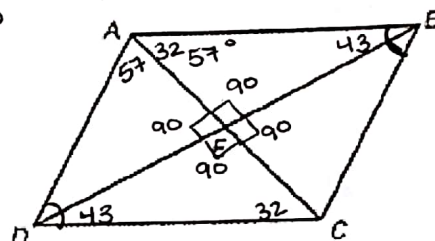
Worksheet 5.7

Decide whether the statement is *sometimes*, *always*, or *never* true.

1. A rhombus is equilateral. *Always!*
2. The diagonals of a rectangle are perpendicular. *Sometimes! If it is also a square*
3. The opposite angles of a rhombus are supplementary. *Always*
4. A square is a rectangle. *Never*
5. The diagonals of a rectangle bisect each other. *Always*
6. The consecutive angles of a square are supplementary. *Always!*

$$\begin{aligned} 5x - 8 &= 3x + 24 \\ -3x + 8 &= -3x + 8 \\ 2x &= 32 \\ x &= 16 \end{aligned}$$

$$\begin{aligned} 3x - 15 &= 90 \\ 3x &= 105 \end{aligned}$$



Quadrilateral *ABCD* is a rhombus.

7. If $m\angle BAE = 32^\circ$, find $m\angle ECD = 32^\circ$
8. If $m\angle EDC = 43^\circ$, find $m\angle CBA = 86$
9. If $m\angle EAB = 57^\circ$, find $m\angle ADC = 66$
10. If $m\angle BEC = 3x - 15^\circ$, solve for x . $x = 35$
11. If $m\angle ADE = 5x - 8^\circ$ and $m\angle CBE = 3x + 24$, solve for x . $x = 16$
12. If $m\angle BAD = 4x + 14^\circ$ and $m\angle ABC = 2x + 10^\circ$, solve for x . $x = 26$

$$\begin{aligned} 114 + 2x &= 180 \\ 2x &= 66 \\ \frac{2x}{2} &= \frac{66}{2} \end{aligned}$$

It is given that *PQRS* is a parallelogram. Decide whether it is a rectangle, a rhombus, a square, or none of the above. Justify your answer using theorems about quadrilaterals.

13. $P(-2, 3)$

$Q(-2, -4)$

$R(2, -4)$

$S(2, 3)$

none of the above

14. $P(7, -1)$

$Q(3, 6)$

$R(-1, -1)$

$S(3, -8)$

rhombus

15. $P(-4, 0)$

$Q(3, 7)$

$R(6, 4)$

$S(-1, -3)$

rectangle

16. $P(1, 1)$

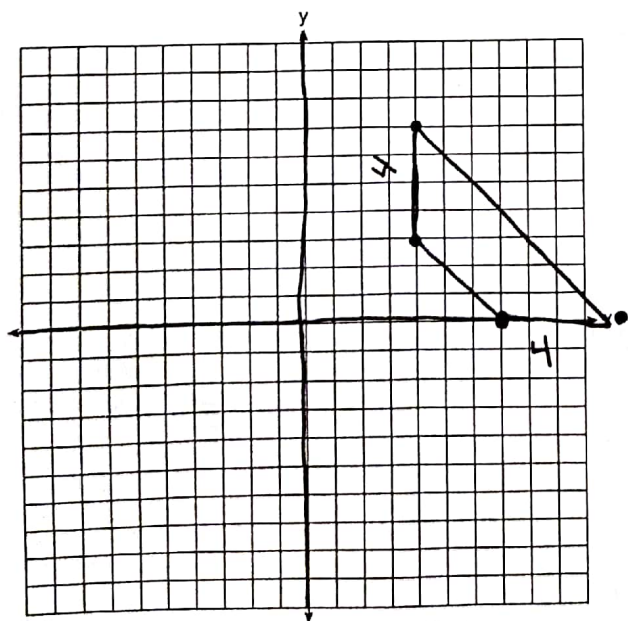
$Q(-2, 4)$

$R(-5, 1)$

$S(-2, -2)$

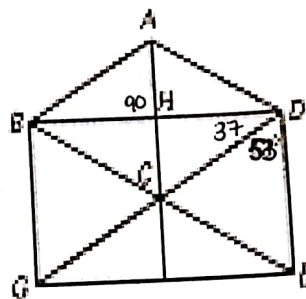
square

17) Quadrilateral *JKLM* has vertices $J(4, 7)$, $K(11, 0)$, $L(7, 0)$, and $M(4, 3)$. Prove quadrilateral *JKLM* is an isosceles trapezoid.



Worksheet 5.8

In the diagram shown, BDEG is a rectangle and ABCD is a rhombus. Find the measure of the indicated angle.



1. $\angle GDN = 37^\circ$
2. $\angle ADC$
3. $\angle DAB$
4. $\angle BCG$
5. $\angle GCE$
6. $\angle DEB$
7. $\angle AHB = 90^\circ$
8. $\angle BGD$

Find the length or angle measure.

14. WXYZ is a square.

$$WX = 1 - 10x$$

$$YZ = 14 + 3x$$

$$XY = \underline{?} \parallel$$

$$\begin{array}{r} 1 - 10x = 14 + 3x \\ -14 + 10x \quad -14 + 10x \end{array}$$

$$\begin{array}{r} -13 = 13x \\ +13 \quad +13 \end{array}$$

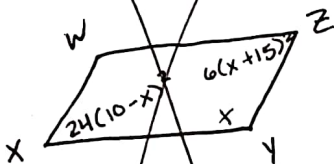
$$x = -1$$

16. WXYZ is a rhombus.

$$m\angle X = 24(10 - x)^2$$

$$m\angle Z = 6(x + 15)^2$$

$$m\angle Y = \underline{?}$$



$$\frac{24(10-x)^2}{6} = \frac{6(x+15)^2}{6}$$

$$\sqrt{4(10-x)^2} = \sqrt{(x+15)^2}$$

$$2(10-x) = x+15$$

$$\begin{array}{r} 20 - 2x = x + 15 \\ -15 + 2x \quad +2x - 15 \end{array}$$

$$\frac{5}{3} = \frac{3x}{3}$$

$$x = \frac{5}{3}$$

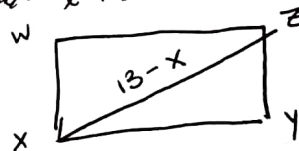
16. WXYZ is a rectangle.

$$\text{Perimeter of } \triangle XYZ = 24$$

$$XY + YZ = 5x - 1$$

$$XZ = 13 - x$$

$$x^2 + w^2 = 24$$



$$2(5x - 1) = 24$$

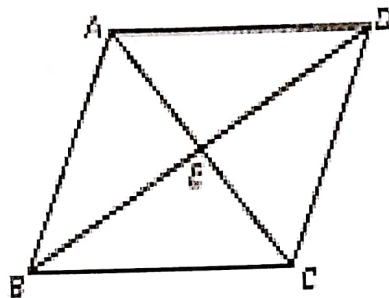
$$\begin{array}{r} 10x - 2 = 24 \\ +2 \quad +2 \end{array}$$

$$\frac{10x}{10} = \frac{26}{10}$$

$$\boxed{x = 2.6}$$

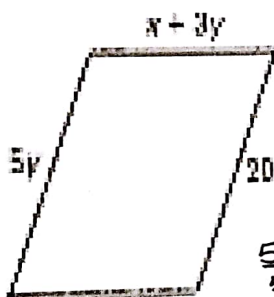
Decide whether each piece of given information alone is sufficient to prove that quadrilateral ABCD is a parallelogram.

1. E is the midpoint of \overline{AC} and \overline{BD} .
2. $m\angle ADC + m\angle BCD = 180^\circ$
3. $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \cong \overline{DA}$
4. $\angle ADC \cong \angle ADC$, and $\angle DAD \cong \angle BCD$
5. $\triangle ABE \cong \triangle DCE$
6. $\triangle ABE = \triangle CDE$



What value of x and y will make the polygon a parallelogram?

7.



$$\frac{5y}{5} = \frac{20}{5}$$

$$y = 4$$

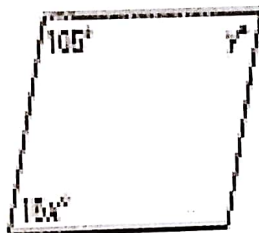
$$2(x + 4 - 1) = 2(x + 4 - 1)$$

$$x + 12 = 2x + 8 - 2$$

$$x + 12 = 2x + 6$$

$$6 = x$$

8.



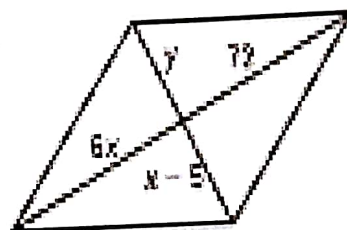
$$180 - 105 = 75$$

$$y = 75$$

$$15x = 75$$

$$x = 5$$

9.



$$6x = 72$$

$$x = 12$$

$$12 - 5 = y$$

$$y = 7$$

Prove that the points represent the vertices of a parallelogram. Use a different method for each exercise.

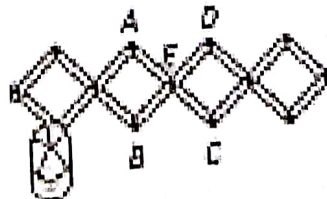
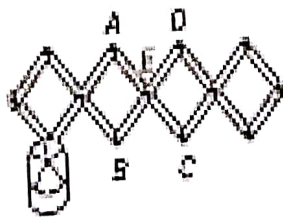
10. A(2, -1), B(1, 3), C(6, 5), and D(7, 1)

11. A(-2, -4), B(1, 2), C(2, 10), and D(-1, 4)

Use the diagram of the adjustable hat rack at the right to answer the following.

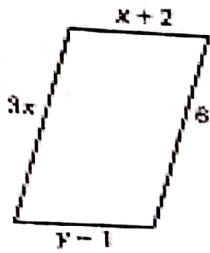
12. Draw the quadrilateral ABCD.

13. If the hat rack were expanded outward, would ABCD still be a parallelogram? Explain.

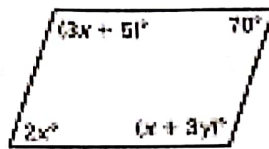


What value of x and y will make the polygon a parallelogram?

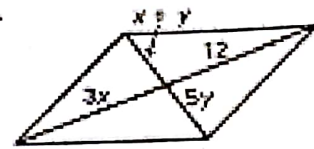
12.



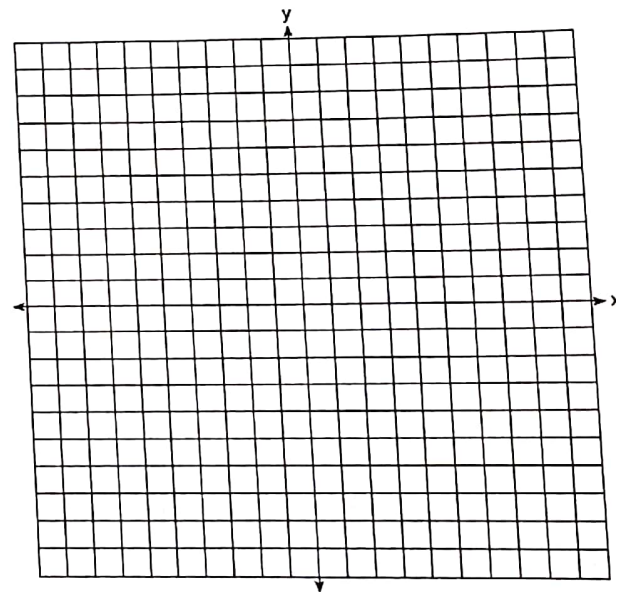
13.



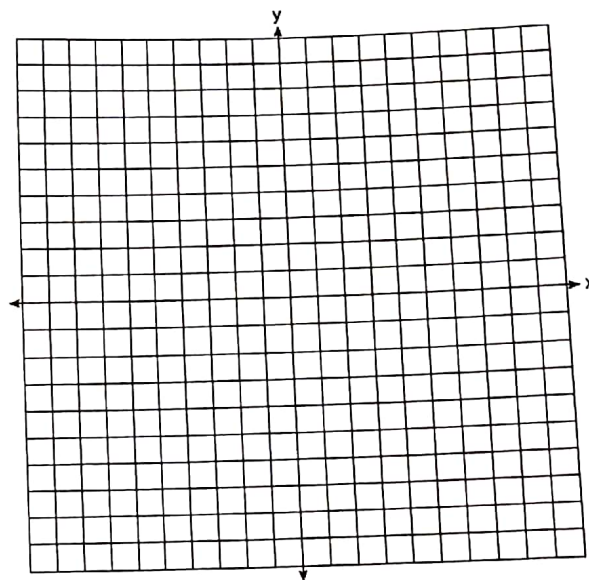
14.



18) Quadrilateral DEFG has vertices at $D(3,4)$, $E(8,6)$, $F(9,9)$ and $G(4,7)$. Prove that DEFG is a parallelogram.



19) The coordinates of the vertices of quadrilateral ABCD are $A(-3,-1)$, $B(6,2)$, $C(5,5)$, and $D(-4, 2)$. Prove that quadrilateral ABCD is a rectangle.



20) The coordinates of the vertices of quadrilateral ABCD are $A(4,1)$, $B(1,5)$, $C(-3,2)$ and $D(0,-2)$. Prove the quadrilateral is a square.

