

Name: _____

Date: _____

Transformations

C 1. What type of transformation moves $P(3, -7)$ to $P'(5, 1)$?

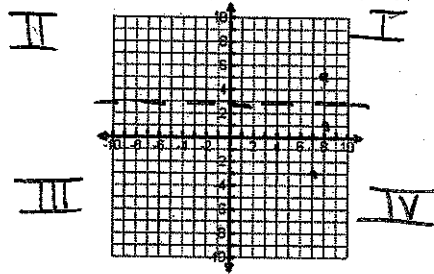
- A. Reflection B. Rotation C. Translation D. Dilation

C 2. If the result of $(x, y) \rightarrow (x - 1, y + 2)$ is $A'(-5, 2)$, what is the **image**, or A?

- A. $(-6, 4)$ B. $(-6, 0)$ C. $(-4, 0)$ D. $(-4, 4)$

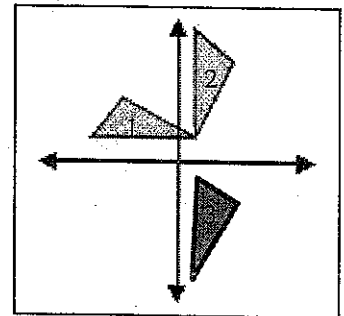
D 3. If $P(8, 5)$ is reflected over the line $y = 3$ and then translated according to the rule $(x, y) \rightarrow (x - 1, y - 4)$, what quadrant will P'' be in?

- A. Quadrant I
B. Quadrant II
C. Quadrant III
D. Quadrant IV



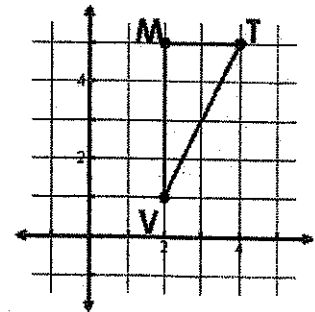
B 4. Triangle 1 is transformed as shown in the diagram, resulting in Triangle 2. Triangle 2 is transformed to create Triangle 3. Describe the combination of transformations (1→2→3).

- A. Dilation, then Rotation
B. Rotation, then Translation
C. Reflection then Translation
D. Translation, then Rotation



B 5. If $\triangle MTV$ is reflected across the **y-axis**, what is the resulting coordinate of T'?

- A. $(5, 4)$
B. $(-4, 5)$
C. $(4, -5)$
D. $(-5, -4)$



C 6. What type of transformation results in a figure that is congruent to the original one?

- A. Dilation
B. Stretch
C. Isometry
D. Not given

7. Line Segment JK with coordinates J(-1, 1), K(-3, -1) is rotated 180° counterclockwise to produce image J'K'.

C Which of these transformations of JK would produce the same image J'K'?

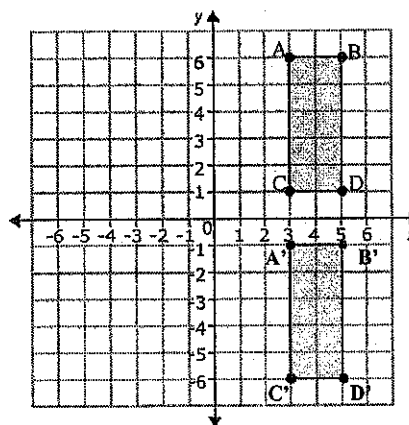
- A. Rotation of 90° counterclockwise
- B. Rotation of 90° clockwise
- C. Rotation of 180° clockwise
- D. Rotation of 270° counterclockwise

B 8. A figure is transformed according to the rule $(x, y) \rightarrow (x + 1, y - 4)$. What transformation has taken place?

- A. Translation of each point 1 unit to the left and 4 units down
- B. Translation of each point 1 unit to the right and 4 units down
- C. Dilation by a scale factor of $-1/4$
- D. Reflection over the x-axis, then translated up 4 units

D 9. The top shape (pre-image) has been translated to the bottom shape (image). The translation rule is:

- A. $(x, y) \rightarrow (x, y - 2)$
- B. $(x, y) \rightarrow (x - 7, y)$
- C. $(x, y) \rightarrow (x - 2, y)$
- D. $(x, y) \rightarrow (x, y - 7)$



B 10. Which two transformations result in the same shape as the above transformation?

- A. Rotation 180°, then a Reflection over the y-axis
- B. Reflection over the x-axis, then a Reflection over $y = -3.5$
- C. Reflection over the x-axis, then a Reflection over $y = -1$
- D. Reflection over the x-axis, then a Reflection over the y-axis

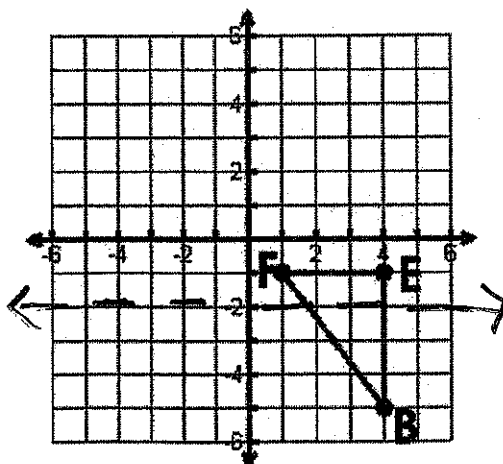
B 11. Given A (-5, 7), if A is transformed by the rule $(x, y) \rightarrow (x + 3, y - 8)$ and then reflected over the y-axis, what is A''?

- A. A'' (-2, 1)
- B. A'' (2, -1)
- C. A'' (2, 1)
- D. A'' (-2, -1)

Perform the given transformations.

12. Reflect the figure over the line $y = -2$.

$F(1, -1) \rightarrow F'(1, -3)$
 $E(4, -1) \rightarrow E'(4, -3)$
 $B(4, -5) \rightarrow B'(4, 1)$

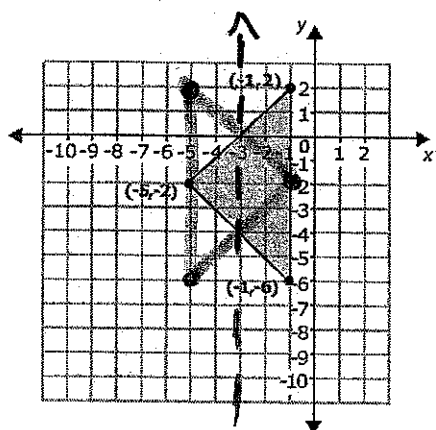
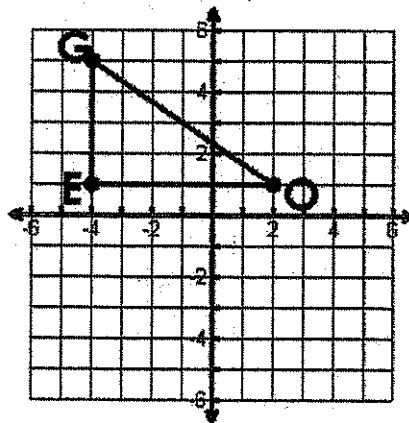


13. Rotate 180° counterclockwise around the origin, then reflect over $y = x$.

$$G(-4, 5) \rightarrow G'(4, -5) \rightarrow G''(-5, 4)$$

$$E(-4, 1) \rightarrow E'(4, -1) \rightarrow E''(-1, 4)$$

$$O(2, 1) \rightarrow O'(-2, -1) \rightarrow O''(-1, -2)$$



Given the quadrilateral ABCD, answer the following questions

14. Reflect ABCD across the line $x = -3$. Draw and label the resulting figure.

Triangle

15. Is this an isometry? How do you know?

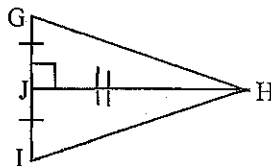
Yes; same shape + same size

Congruence

16. Complete the congruence statement: $\triangle GJH \cong \triangle$ _____ by _____.

a.

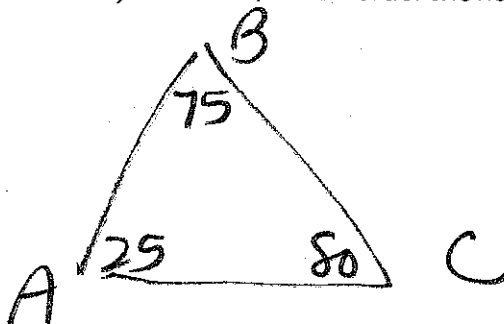
- a) $\triangle GJH \cong \triangle IJH$ by SAS
- b) $\triangle GJH \cong \triangle IHJ$ by SAS
- c) $\triangle GJH \cong \triangle IJH$ by HL
- d) $\triangle GJH \cong \triangle IHJ$ by HL

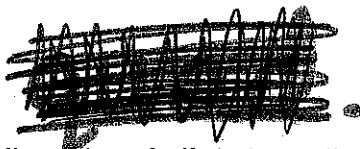


17. If the angles in a triangle are $\angle A = 25^\circ$, $\angle B = 75^\circ$, $\angle C = 80^\circ$, which order shows the sides from greatest to least?

c

- a) $\overline{BC}, \overline{AC}, \overline{AB}$
- b) $\overline{AC}, \overline{BC}, \overline{AB}$
- c) $\overline{AB}, \overline{AC}, \overline{BC}$
- d) $\overline{BC}, \overline{AB}, \overline{AC}$





If $a = b + b = c$ then $a = c$

18. What is the value of x if we know the following information:
 $\angle ADC \cong \angle ADB$; $\angle ADB \cong \angle BDC$; $\angle ADC = (9x + 3)^\circ$; $\angle BDC = (11x - 23)^\circ$

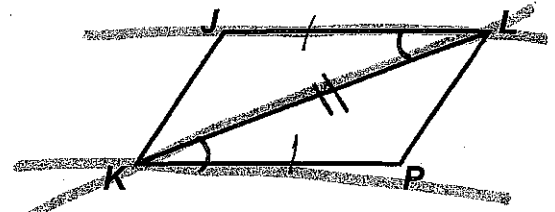
- a) -1
- b) 10
- c) 13
- d) 120

$$9x + 3 = 11x - 23$$

$$26 = 2x$$

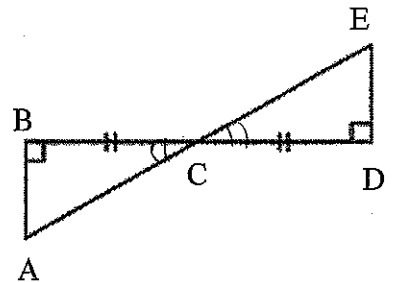
$$13 = x$$

19. Given: $\overline{JL} \cong \overline{KP}$, $\overline{JL} \parallel \overline{KP}$
Prove: $\triangle JLK \cong \triangle PKL$



Statements	Reasons
①	① given
② $\overline{KL} \cong \overline{KL}$	② reflexive
③ $\angle JLK \cong \angle LKP$	③ alt int $\angle s \cong$
④ $\triangle \cong \triangle$	④ SAS

20. Given: $\angle B = 90^\circ$; $\angle D = 90^\circ$; $\overline{BC} \cong \overline{DC}$
Prove: $\overline{AB} \cong \overline{ED}$

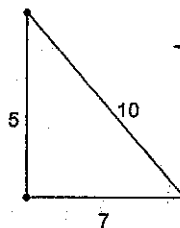
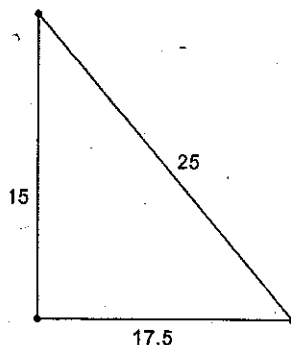


Statements	Reasons
①	① given
② $\angle B \cong \angle D$	② all rt $\angle s \cong$
③ $\angle BCA \cong \angle DCE$	③ vert $\angle s \cong$
④ $\triangle ABC \cong \triangle EDC$	④ ASA
⑤ $\overline{AB} \cong \overline{ED}$	⑤ CPCTC

Similarity and Trig

21. Are the triangles shown below similar? If yes, how would you prove it?

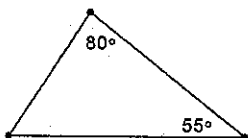
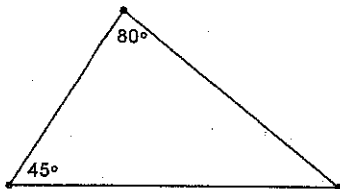
- A. Yes, by AA similarity
- B. Yes, by SSS similarity
- C. Yes, by SAS similarity
- D. No, the triangles are not similar



$$\frac{25}{10} = \frac{17.5}{7} = \frac{15}{5}$$

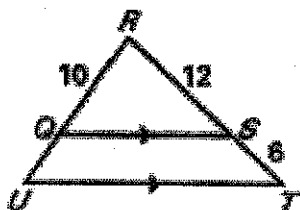
$$\frac{5}{2} = \frac{5}{2} \neq 3$$

22. Which postulate or theorem would prove these triangles to be similar?



- A. ASA similarity
- B. SAS similarity
- C. AA similarity
- D. The triangles are not similar

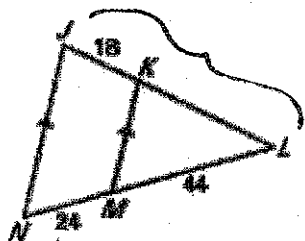
23. Find the length of \overline{QU} .



$$\frac{10}{x} = \frac{12}{6}$$

- A. 16
- B. 7.2
- C. 5
- D. 4

24. Find the length of \overline{JL} .



$$\frac{x}{18} = \frac{68}{24}$$

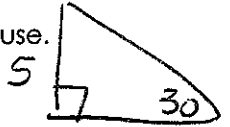
$$24x = 1224$$

$$x = 51$$

- A. 38
- B. 33
- C. 50
- D. 51

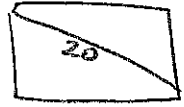
25. In a 30-60-90 right triangle, the length of the short leg is 5. Find the length of the hypotenuse.

- A. $\frac{\sqrt{3}}{5}$ B. 10 C. $5\sqrt{2}$ D. $5\sqrt{3}$ E. None of these



26. The length of a diagonal of a square is 20 inches. What is its perimeter?

- A. $40\sqrt{2}$ in. B. $40\sqrt{2}$ in. C. $20\sqrt{2}$ in. D. $30\sqrt{2}$ in. E. None of these

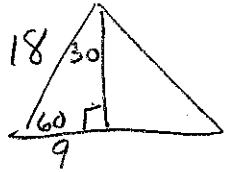


$\frac{20}{\sqrt{2}} \rightarrow \frac{\sqrt{2}}{\sqrt{2}} = 10\sqrt{2}$

Same

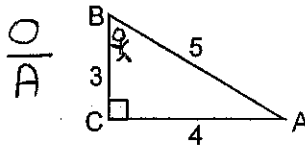
27. The side of an equilateral triangle is 18 meters. What is the height of the triangle?

- A. 9 m B. $20\sqrt{2}$ m C. $9\sqrt{2}$ m D. $9\sqrt{3}$ m E. None of these



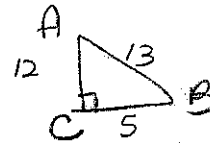
28. Given $\triangle ABC$, what is $\tan B = \frac{O}{A}$ = ___?

- A. $\frac{3}{4}$ B. $\frac{4}{3}$ C. $\frac{3}{5}$ D. $\frac{4}{5}$ E. None of these



29. In a right triangle, $\sin A = \frac{5}{13}$. What is $\cos A = \frac{O}{H}$ = ___?

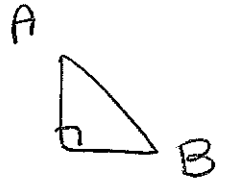
- A. $\frac{5}{13}$ B. $\frac{12}{13}$ C. $\frac{5}{12}$ D. Cannot be determined E. None of these



PythagThm

30. In right $\triangle ABC$, $\angle A$ and $\angle B$ are the acute angles. If $\sin A = \frac{7}{25}$, what is $\cos B = \frac{O}{H}$ = ___?

- A. $\frac{7}{25}$ B. $\frac{24}{25}$ C. $\frac{7}{24}$ D. Cannot be determined E. None of these



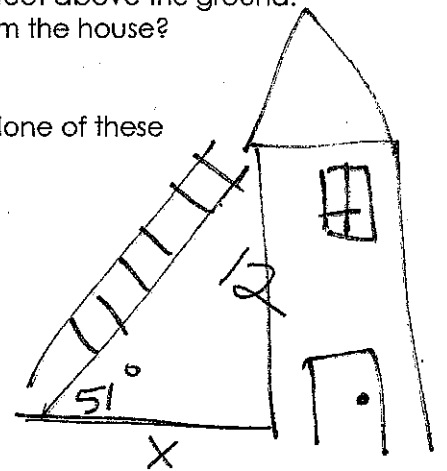
31. A ladder is leaning against a house so that the top of the ladder is 12 feet above the ground. The angle with the ground is 51° . How far is the base of the ladder from the house?

- A. 7.6 ft B. 9.7 ft C. 15.4 ft D. 14.8 ft E. None of these

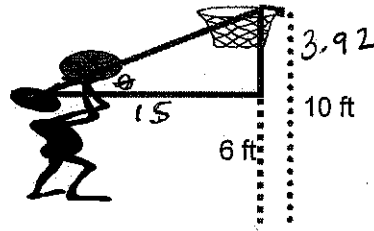
$$\tan 51 = \frac{12}{x}$$

$$x \tan 51 = 12$$

$$x = \frac{12}{\tan 51}$$



32. The eyes of a basketball player are 6.08 feet above the floor. The player is at the free-throw line, which is 15 feet from the center of the basket rim. The rim is 10 feet above the floor. What is the angle of elevation from the player's eyes to the center of the rim?



$$\tan \theta = \frac{3.92}{15}$$

$$\tan^{-1}\left(\frac{3.92}{15}\right) = \theta$$

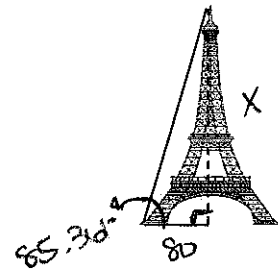
$$14.65^\circ = \theta$$

33. Find the height in feet of the Eiffel Tower if the angle of elevation from the base is 85.361° and the distance from the center to the outside of each leg is 80 feet.

$$\tan 85.361 = \frac{x}{80}$$

$$80 \tan 85.361 = x$$

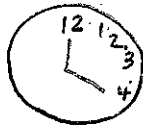
$$985.911 \text{ ft} = x$$



Circles: Arcs and Angles

- D 34. A wall clock has an area of 452.4 square inches. What is the area of the sector formed by the hands of the clock when it is 4:00?

- a) 113.1 in²
 b) 301.6 in²
 c) 120 in²
 d) 150.8 in²



$$A = \pi r^2 = 452.4$$

$$r^2 = 144.003$$

$$r = 12.0001$$

$$A_{\text{sector}} = \frac{120}{360} \pi r^2$$

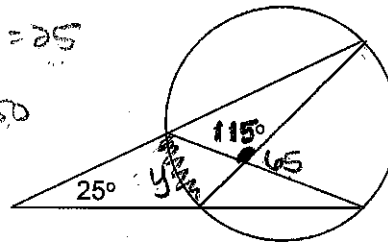
$$= \frac{120}{360} 452.4$$

- A 35. What is the value for x in the given figure?

- a) 90
 b) 130
 c) 50
 d) 57.5

$$\frac{x+y}{2} = 65 \quad \frac{x-y}{2} = 25$$

$$x+y = 130 \quad x-y = 50$$



$$x+y = 130$$

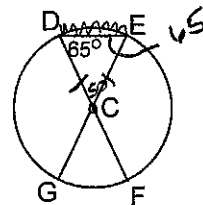
$$x-y = 50$$

$$2x = 180$$

$$x = 90$$

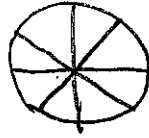
- C 36. Refer to the diagram. If C is the center of the circle, what is the measure of arc DE?

- a) 130
 b) 65
 c) 50
 d) 25



- B 37. A quiche is sliced into 8 equal pieces. The arc length of one piece of quiche is 6.28 inches as shown. What is the diameter of the quiche?

- a) 8 in. RADUS
 b) 16 in.
 c) 12 in.
 d) 10 in.



$$AL = \frac{\theta}{360} 2\pi r = 6.28$$

$$= \frac{45}{360} 2\pi r = 6.28$$

$$.786r = 6.28$$

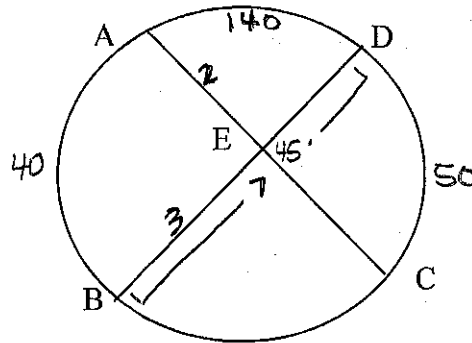
Find each needed measurement given the following information and the picture below:

\overline{BD} is the diameter, $\angle DEC = 45^\circ$, $\overline{AB} = 40$, $\overline{AE} = 2$, $\overline{BE} = 3$, and $\overline{BD} = 7$.

38. Arc AD = 140

39. Arc BC = 130

~~40.~~ $\overline{EC} =$ _____



$$\frac{40+x}{2} = 45$$

$$40+x = 90$$

$$x = 50$$

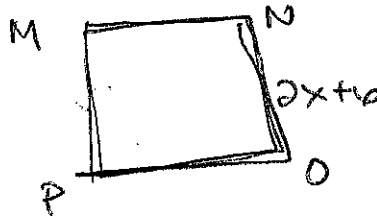
Parallelograms and Quadrilaterals

- B 41. Opposite angles of a parallelogram are _____.
- a. Sometimes congruent
 b. Always congruent
 c. Complementary
 d. Supplementary

- B 42. Which of the following is a property specific to rectangles that is not true for other parallelograms?
- a. Diagonals bisect each other.
 b. Diagonals are congruent.
 c. Diagonals are perpendicular. SQ RH
 d. Diagonals bisect pairs of opposite angles. SQ RH

- D 43. Given square MNOP. The perimeter of MNOP is 72cm, $NO = 2x + 6$. Find x.

- a. $x = 15$
 b. $x = 12$
 c. $x = 9$
 d. $x = 6$



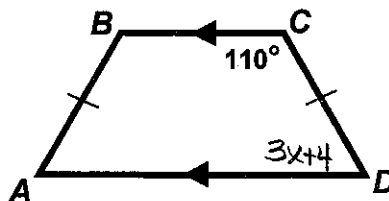
$$4(2x+6) = 72$$

$$8x + 24 = 72$$

$$8x = 48$$

- B 44. Given the diagram below. $m\angle D = 3x + 4$, find x.

- a. $x = 80$
 b. $x = 22$
 c. $x = 66$
 d. $x = \frac{106}{3}$



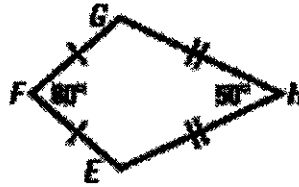
$$110 + 3x + 4 = 180$$

$$3x + 114 = 180$$

$$3x = 66$$

45. Given the diagram below, find $m\angle E$.

- a. $m\angle E = 130^\circ$
- b. $m\angle E = 65^\circ$
- c. $m\angle E = 50^\circ$
- d. $m\angle E = 115^\circ$

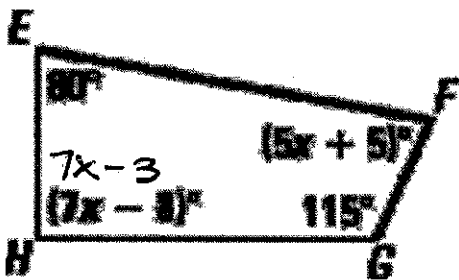


$$\begin{array}{r} 360 \\ - 130 \\ \hline 230 \\ \div 2 \\ \hline 115 \end{array}$$

Fill in the blank with "sometimes", "always", or "never" for #20 - 24.

- 46) A rectangle is N a trapezoid.
- 47) A rhombus S has 4 congruent angles.
- 48) A square is A a parallelogram.
- 49) A rectangle is N a rhombus.
- 50) A quadrilateral with perpendicular diagonals are S a rhombus.

51. Use the information in the diagram to solve for x . Then find the values of the missing interior angles. Show your work.



$$\begin{aligned} 80 + 7x - 3 + 5x + 5 + 115 &= 360 \\ 12x + 197 &= 360 \\ 12x &= 163 \\ x &= 14 \end{aligned}$$

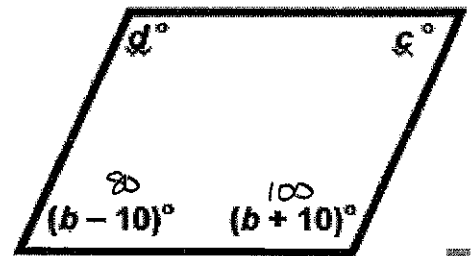
$x = \underline{14}$

$\angle F = \underline{75}$

$\angle H = \underline{95}$

52. Find the value of each variable in the parallelogram.

$b = \underline{90}$ $c = \underline{80}$ $d = \underline{100}$



$$\begin{aligned} b - 10 + b + 10 &= 180 \\ 2b &= 180 \\ b &= 90 \end{aligned}$$

