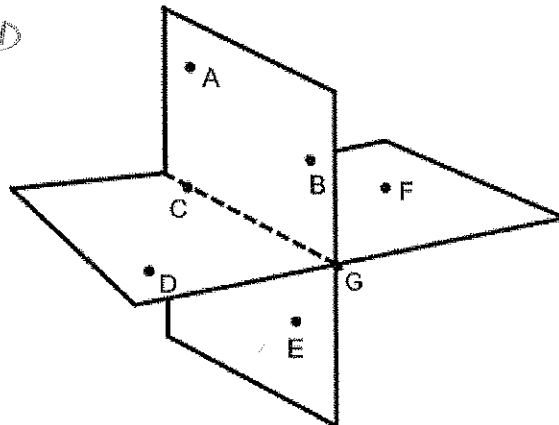


GEOMETRY 21: Review for Final Exam

Part 1

True or False:

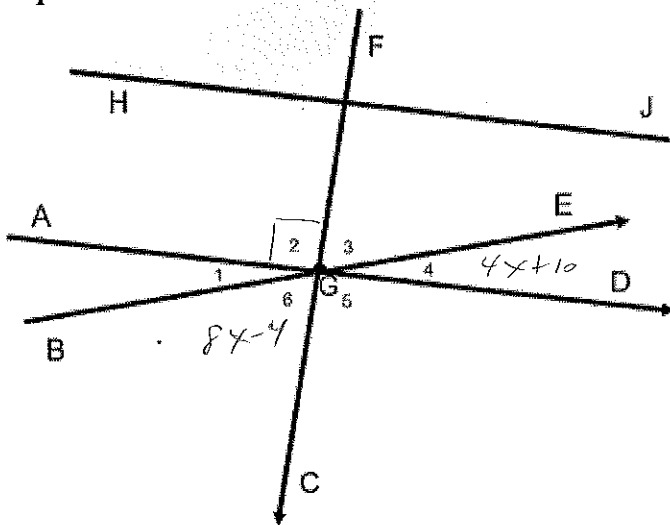
- 1) F Any 2 lines always intersect at one point
- 2) F Through any 2 points there is exactly one plane
- 3) T Any 3 points are always coplanar
- 4) F If \overline{AB} bisects \overline{CD} at point E, then $AE = EB$.



Use the diagram at the right to answer the questions #5-10:

- 5) Name the intersection of \overleftrightarrow{CB} and plane DCF _____
- 6) Name the intersection of \overleftrightarrow{AB} and plane ACE _____
- 7) Name the intersection of plane DCF and plane ABE _____
- 8) Are point A, B, and D coplanar? _____
- 9) Name the intersection of \overrightarrow{EB} (ray) and \overrightarrow{BE} (ray) _____
- 10) How many planes can pass through \overleftrightarrow{CG} ? _____

Use the diagram below for questions #11-15:



11) $\angle 2$ is a right angle and $m\angle 4 = 4x + 10$ degrees, and the $m\angle 6 = 8x - 4$ degrees, what is the value of x ?

$x = 7$ $m\angle 3 = 52$

$(4x + 10) + (8x - 4) = 90$
 $12x + 6 = 90$
 $12x = 84$
 $x = 7$
 $m\angle 3 = 8(7) - 4 = 52$

12) If $m\angle 6 = y$, then write an expression for the $m\angle BGF$ _____

13) If the $m\angle 5 = 90^\circ$, then name 2 angles that are the complements of $\angle 4$. _____ and _____

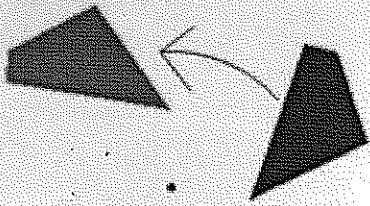
14) If $m\angle 5 = 90^\circ$, name 2 angles that are supplementary, but do **not** form a linear pair. _____ and _____

15) $\overline{HJ} \perp \overline{FC}$ and $\overline{AD} \perp \overline{FC}$, then $\overline{AD} \underline{\hspace{1cm}} \overline{HJ}$

Identify the type of transformation. (Translation, reflection, rotation)

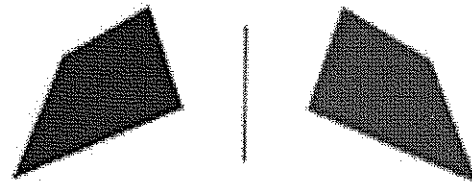
Rigid transformation

16)



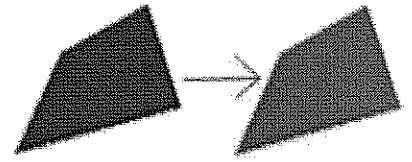
This is a rotation

17)



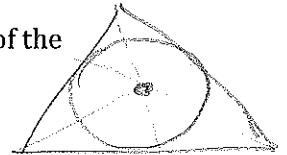
This is a reflection

18)

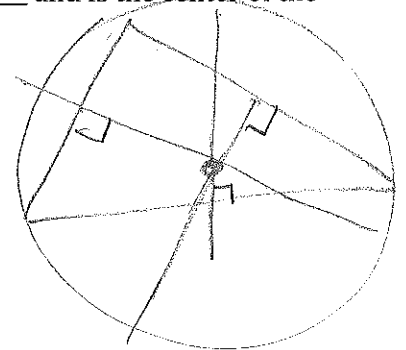


This is a translation

19) The intersection of the angle bisectors is called the incenter and is the center of the inscribed circle.



20) The intersection of these perpendicular bisectors is called the Circumcenter and is the center of the Circumscribed circle.



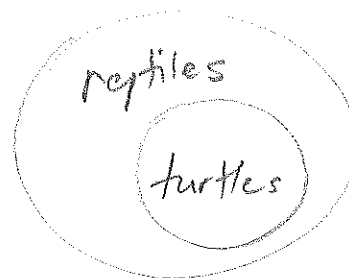
21) The intersection of the medians is called the centroid

22) The intersection of the altitudes is called the orthocenter

Part 2

All turtles are reptiles.

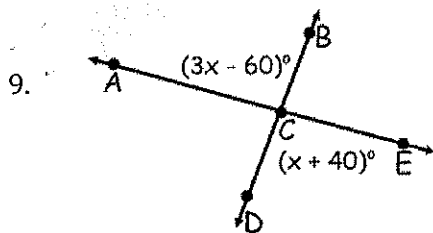
1. Rewrite the statement as a conditional. If the animal is a turtle then it is a reptile.
2. Identify the hypothesis the animal is a turtle and conclusion it is a reptile
3. Draw a Venn diagram that illustrates the statement.



Linear pairs are supplementary, adjacent angles.

5. Rewrite the statement as a conditional. If angles form a linear pair, then the angles are suppl. & adj.
6. Write the converse of the conditional. If angles are suppl. & adj., then the angles form a linear pair.
7. Write the statement as a biconditional. Angles form a linear pair iff they are suppl. and adj.
8. Is the statement a definition? yes If so, explain your reasoning. Both the cond. & conv. are true

Using each diagram, determine the value of x .

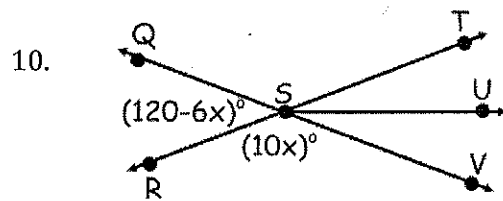


$$3x - 60 = x + 40$$

$$2x = 100$$

$$x = 50$$

$$x = \underline{50}$$



$$120 - 6x + 10x = 180$$

$$4x = 60$$

$$x = 15$$

$$x = \underline{15}$$

Match each property with its definition.

- | | |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 11. <u>f</u> Addition property | a.) If $a = b$, then $ac = bc$ |
| 12. <u>g</u> Symmetric Property | b.) If $a = b$, then $a - c = b - c$ |
| 13. <u>d</u> Substitution Property | c.) For all real numbers a , $a = a$. |
| 14. <u>a</u> Multiplication Property | d.) If $a = b$, you may replace a with b in any true equation containing a and the resulting equation will still be true. |
| 15. <u>e</u> Division Property | e.) If $a = b$, and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$ |
| 16. <u>c</u> Reflexive Property | f.) If $a = b$, then $a + c = b + c$ |
| 17. <u>b</u> Subtraction Property | g.) For all real numbers a and b , if $a = b$, then $b = a$. |
| 18. <u>h</u> Transitive Property | h.) For all real numbers a and b , if $a = b$ and $b = c$, then $a = c$. |

Use the figure at the right to determine the following angle measures

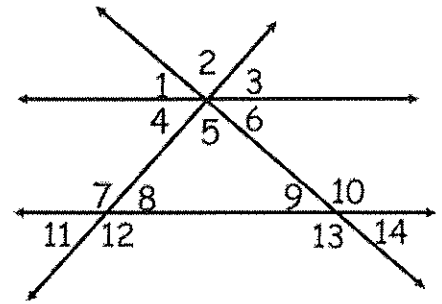
Given: $\angle 8 \cong \angle 4$

$$m\angle 5 + m\angle 8 + m\angle 9 = 180^\circ$$

$$m\angle 2 = 102.16^\circ$$

$$m\angle 8 = 7x + 19$$

$$m\angle 11 = 32x - 83$$



19.) $x =$ _____

20.) $m\angle 4 =$ _____

21.) $m\angle 5 =$ _____

22.) $m\angle 9 =$ _____

23.) $m\angle 10 =$ _____

24.) $m\angle 12 =$ _____

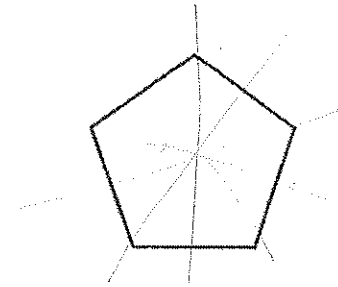
25.) $m\angle 1 =$ _____

26.) $m\angle 3 =$ _____

Part 3

1. How many lines of symmetry does the figure at right have?

- a. 0 b. 1 c. 5 d. 10



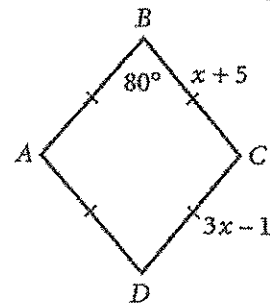
2. What is the angle of rotation for the rotational symmetry of the figure?

- a. 0° b. 50° c. 72° d. 180°

$$\frac{360}{5} = 72^\circ$$

3. What type of quadrilateral is ABCD?

- a. square b. rhombus c. rectangle d. trapezoid



$$3x - 1 = x + 5$$

$$2x = 6$$

$$x = 3$$

4. What is the length of side \overline{AB} ?

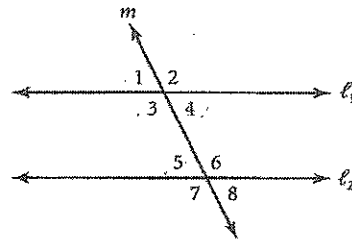
- a. 3 b. 6 c. 8 d. 9

5. What is the measure of $\angle A$?

- a. 80° b. 90° c. 100° d. 180°

6. What type of angles are $\angle 3$ and $\angle 6$?

- a. alternate interior
- b. alternate exterior
- c. same-side interior
- d. corresponding



Items 6 through 9

7. If $l_1 \parallel l_2$ and $m\angle 1 = 110^\circ$, then $m\angle 6 =$

- a. 35°
- b. 55°
- c. 70°
- d. 110°

8. If $l_1 \parallel l_2$ and $m\angle 5 = 75^\circ$, then $m\angle 3 =$

- a. 15°
- b. 75°
- c. 90°
- d. 105°

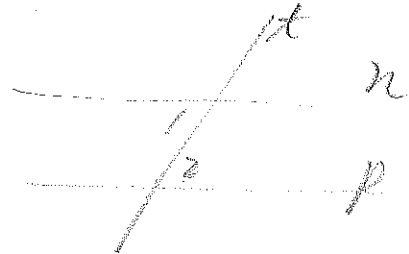


9. If $m\angle 5 = 55^\circ$ and $m\angle 4 = 35^\circ$, then l_1 and l_2 _____.

- a. are perpendicular
- b. are parallel
- c. intersect at an acute angle
- d. intersect at an obtuse angle

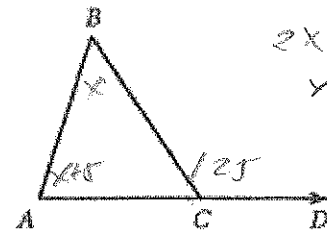
10. Suppose $\angle 1$ and $\angle 2$ are alternate interior angles formed by parallel lines n and p and transversal t . Which of the following must be true?

- a. $\angle 1$ and $\angle 2$ are complementary
- b. $\angle 1$ and $\angle 2$ are congruent
- c. $\angle 1$ and $\angle 2$ are supplementary
- d. $\angle 1$ and $\angle 2$ have a common vertex



11. If $m\angle A = x + 5$, $m\angle B = x$, and $m\angle BCD = 125^\circ$, then $m\angle A =$

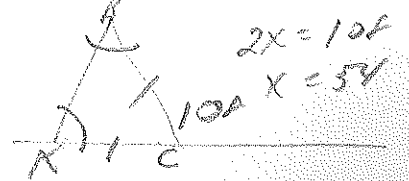
- a. 55°
- b. 60°
- c. 65°
- d. 185°



$$\begin{aligned} x + x + 125 &= 180 \\ 2x &= 55 \\ x &= 27.5 \end{aligned}$$

12. If $\overline{AC} \cong \overline{BC}$ and $m\angle BCD = 108^\circ$, then $m\angle A =$

- a. 54°
- b. 72°
- c. 36°
- d. 90°



$$\begin{aligned} 2x + 108 &= 180 \\ 2x &= 72 \\ x &= 36 \end{aligned}$$

13. What is the sum of the measures of the interior angles of a hexagon?

- a. 180°
- b. 360°
- c. 540°
- d. 720°

$$180(6-2) = 720$$

14. What is the measure of an interior angle of a regular pentagon?

- a. 60° b. 72° c. 108° d. 120°

$$\frac{180(5-2)}{5}$$

15. If the measure of an exterior angle of a regular polygon is 18° , how many sides does the polygon have?

- a. 6 b. 8 c. 15 d. 20

$$\frac{360}{18} = 20$$

16. If the measure of an interior angle of a regular polygon is 140° , how many sides does the polygon have?

- a. 10 b. 9 c. 8 d. 5

$$\frac{180(n-2)}{n} = 140$$

$$180n - 360 = 140n$$

$$40n = 360$$

$$n = 9$$

17. The measure of an interior angle of a regular polygon is four times the measure of its exterior angle. How many sides does the polygon have?

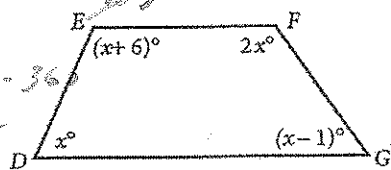
- a. 15 b. 12 c. 10 d. 8

$$4\left(\frac{360}{n}\right) = \frac{180(n-2)}{n}$$

$$1440 = 180n - 360$$

$$1800 = 180n$$

$$10 = n$$



18. What is $m\angle G$ in quadrilateral DEFG?

- a. 35° b. 70° c. 71° d. 77°

$$x + 6 + 2x + x + x - 1 = 360$$

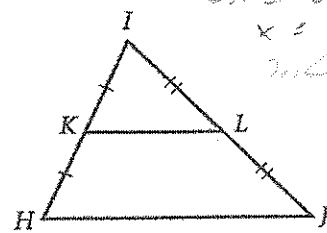
$$5x = 357$$

$$x = 71$$

$$m\angle G = 70$$

19. If $HJ = 26$, then $KL =$

- a. 13 b. 26 c. 30 d. 52



20. If $HJ = 3x - 1$ and $KL = x + 1$, then $HJ =$

- a. 3 b. 4 c. 8 d. 10

$$3x - 1 = 2(x + 1)$$

$$x = 3$$

$$HJ = 9 - 1 = 8$$

21. Determine a value of r so that a line through $(r, 3)$ and $(7, 4)$ has a slope of $\frac{1}{2}$.

- a. 7 b. 5 c. -1 d. 2

$$\frac{4-3}{7-r} = \frac{1}{2}$$

22. Find the slope of any line perpendicular to the line through $(-1, 5)$ and $(0, -3)$

- a. $1/8$ b. -8 c. $-1/8$ d. 8

$$\frac{-3-5}{0-(-1)} = \frac{-8}{1}$$

$$\frac{1}{8}$$

Classify each statement as true or false.

F 23. Two lines that are not parallel must intersect. *skew*

T 24. Two noncoplanar lines cannot be parallel.

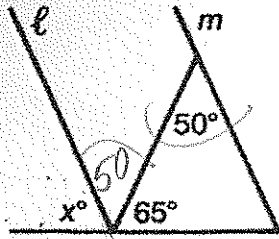
T 25. A line and plane must either be parallel or intersect.

T 26. If two parallel planes are cut by a third plane, then the lines of intersection cannot intersect one another.

T 27. If P, Q, and R are noncollinear, only one line can be drawn through P parallel to \overline{QR} .

Find the value of x for which $l \parallel m$.

28.

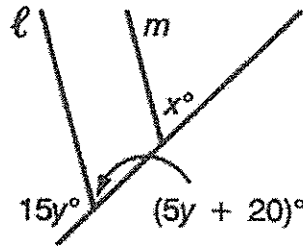


$$180 - (50 + 65)$$

$$65$$

65

29.



$$5y + 20 + 15y = 180$$

$$20y = 160$$

$$y = 8$$

$$5(8) + 20 = x$$

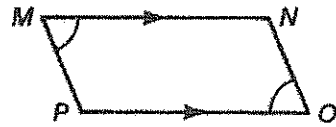
$$60 = x$$

60

30. Write a two-column proof.

Given: $\overline{MN} \parallel \overline{PO}$; $\angle M \cong \angle O$

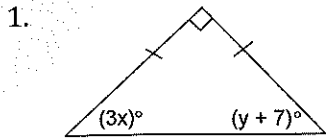
Prove: $\overline{MP} \parallel \overline{NO}$



Statements	Reasons
1. $MN \parallel PO$, $\angle M \cong \angle O$	1. Given
2. $\angle P$ & $\angle M$ are SSI	2. Defn SSI
3. $\angle P$ & $\angle M$ are sup.	3. SSI then
4. $m\angle P + m\angle M = 180^\circ$	4. Defn suppl
5. $\angle M \cong \angle O$	5. given
6. $m\angle M = m\angle O$	6. Defn \cong
7. $m\angle P + m\angle O = 180^\circ$	7. Subst.
8. $\angle P$ & $\angle O$ are suppl	8. Defn suppl
9. $\angle P$ & $\angle O$ are SSI \angle s	9. Defn SSI \angle s
10. $\therefore \overline{MP} \parallel \overline{NO}$	10. Conv. SSI then

Part 4

Solve for the missing variable(s).



$$3x + y + 7 = 90$$

$$3x = y + 7$$

$$y = 3x - 7$$

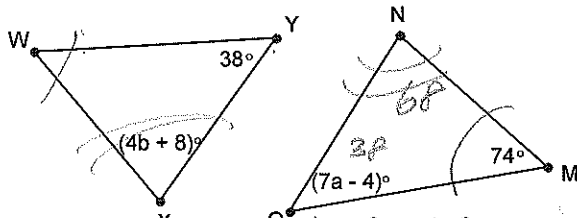
$$3x + 3x - 7 + 7 = 90$$

$$6x = 90$$

$$x = 15$$

$$y = 45 - 7 = 38$$

3. Given $\triangle WXY \cong \triangle MNO$, find the values of a and b .



$$7a - 4 = 38$$

$$7a = 42$$

$$a = 6$$

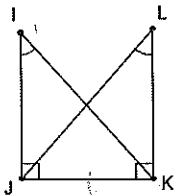
$$4b + 8 = 68$$

$$4b = 60$$

$$b = 15$$

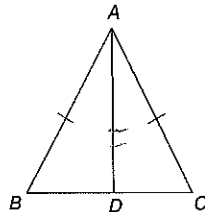
Decide whether there is enough information to prove the triangles are congruent. State the postulate or theorem that you would use to prove the triangles congruent.

4. $\triangle IKJ \cong \triangle LJK$



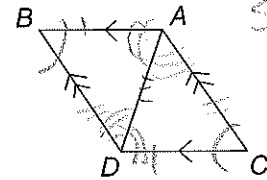
Yes
AAS
or
ASA

5. $\triangle ABD \cong \triangle ACD$



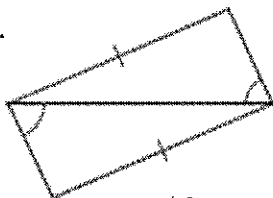
NO

6. $\triangle ABD \cong \triangle ACD$



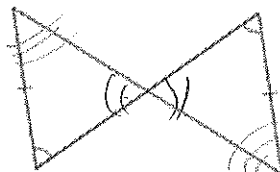
Yes
SSS
AAS
ASA
SAS

7.



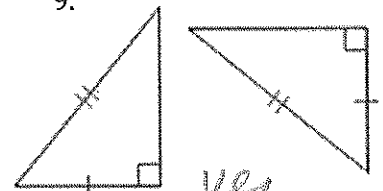
NO
(No ASS!)

8.



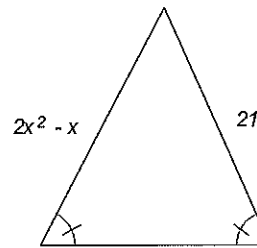
yes
AAS
ASA

9.



yes
HL

2.



$$2x^2 - x = 21$$

$$2x^2 - x - 21 = 0$$

$$\begin{array}{r|l} 3 & 6x - 21 \\ \times & 2x^2 - 7x \\ \hline & 2x - 7 \end{array}$$

$$\begin{array}{r} +42x^2 \\ 6x - 7x \\ -x \end{array}$$

$$(x+3)(2x-7) = 0$$

$$x+3=0 \quad 2x-7=0$$

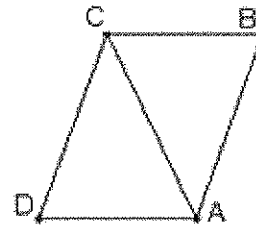
$$x=-3 \quad 2x=7$$

$$x=3.5$$

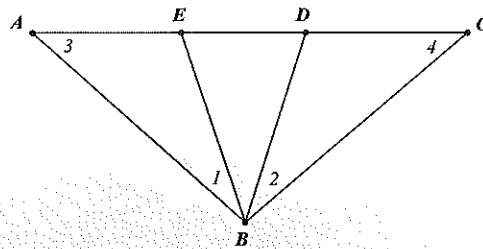
check $2(9) + 3 = 21$ ✓
 $2(3.5)^2 - 3.5 = 21$ ✓

Prove the following:

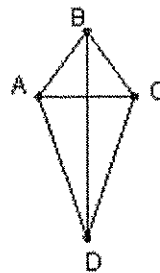
10. Given: $\angle D \cong \angle B$; $\overline{CB} \parallel \overline{DA}$
Prove: $\triangle DCA \cong \triangle BAC$



11. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$
Prove: $\triangle BDE$ is isosceles



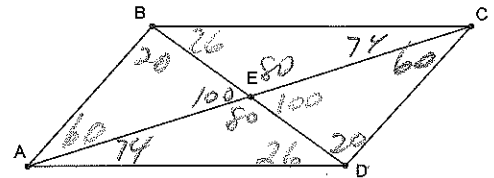
12. Given: ABCD is a kite with $\overline{AB} \cong \overline{BC}$; $\overline{AD} \cong \overline{CD}$
Prove: \overline{BD} bisects \overline{AC}



13. ABCD is a parallelogram with diagonals \overline{AC} and \overline{BD} .

a.) If $m\angle CBD = 26^\circ$, $m\angle DCA = 60^\circ$, $m\angle DEC = 100^\circ$. Find $m\angle BAD$.

134



b.) If $BE = x + 3$, $BD = 3x - 1$, $BC = 3x + y$ and $AD = 25$, find x and y .

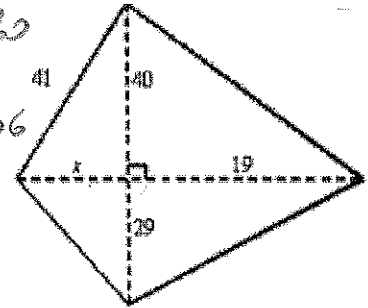
$$\begin{aligned} 2(x+3) &= 3x-1 & 3x+y &= 25 \\ 2x+6 &= 3x-1 & 3(7)+y &= 25 \\ |7 &= x & y &= 4 \end{aligned}$$

Part 5

1. Find the area of the quadrilateral. $A_{top \Delta} = \frac{1}{2}(9+19)(40) = 560$

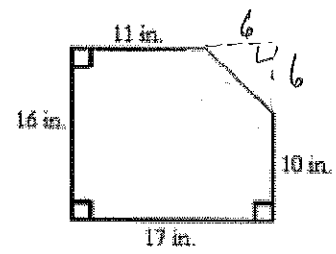
$$\begin{aligned} x &= \sqrt{41^2 - 40^2} \\ &= \sqrt{81} \\ &= 9 \end{aligned}$$

$$\begin{aligned} A_{bottom \Delta} &= \frac{1}{2}(9+19)(29) = 426 \\ 560 + 426 &= 986 \text{ units}^2 \end{aligned}$$



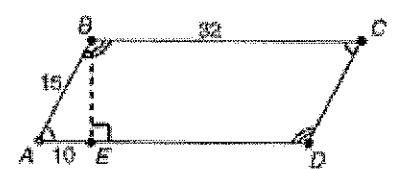
2. What is the area of the figure?

$$\begin{aligned} A_{triangle} &= \frac{1}{2}(6)(6) = 18 \\ A_{rectangle} &= (16)(17) = 272 \\ 272 - 18 &= 254 \text{ in}^2 \end{aligned}$$



3. Find the area of the parallelogram ABCD. Leave answer in exact form (simplified square root).

$$\begin{aligned} \text{height} &= \sqrt{125} \quad 10^2 + h^2 = 15^2 \\ & \quad h^2 = 125 \\ & \quad h = \sqrt{125} \\ A &= bh = 32\sqrt{125} \\ &= 32 \cdot 5\sqrt{5} = 160\sqrt{5} \text{ units}^2 \end{aligned}$$



4. Find the area of the triangle to the nearest tenth.

$$\frac{1}{2}(5)(5) = 12.5 \text{ units}^2$$

