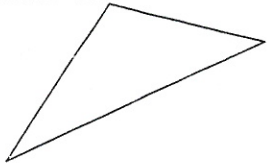


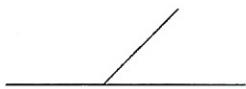
# Geometry Reminders for the ACT

## Angle Measures

Interior angles of a triangle add to  $180^\circ$



Angles that form a line add to  $180^\circ$  (are supplementary)



Angles that form around a point add to  $360^\circ$



Interior angles of a polygon with  $n$  sides add to  $180(n - 2)$

ex: With 5 sides, you can make 3 (or  $5 - 2$ ) triangles drawing diagonals from any one vertex. Interior angle sum will be  $180 \times 3 = 540^\circ$ .



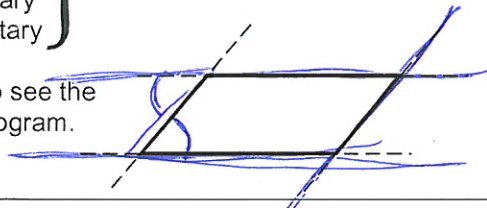
## Angles Formed by Parallel Lines and a Transversal

If parallel lines are cut by a transversal, then

- alternate interior angles  $\cong$
- corresponding angles  $\cong$
- alternate exterior angles  $\cong$
- same side interior angles are supplementary
- same side exterior angles are supplementary

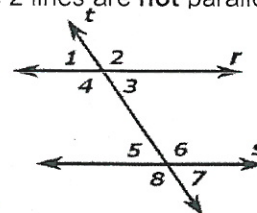
\*

Extend parallel lines and transversal to help see the relationships in polygons such as a parallelogram.



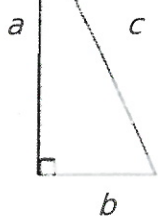
If any of \*, then the lines cut by the transversal are parallel.

If any of \* **not** true, then the 2 lines are **not** parallel.



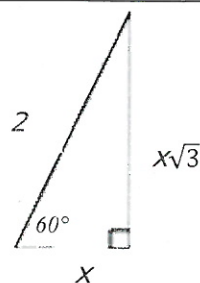
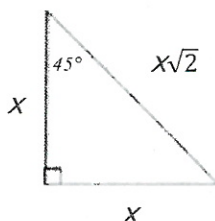
## Side Measures of Triangles

If then  $a^2 + b^2 = c^2$ .

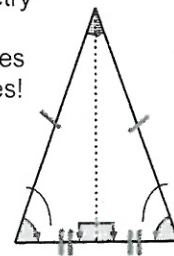


Pythagorean Triples can save you time.

3,4,5 / 6,8,10 / 9,12,15  
5,12,13 / 10,24,26  
7,24,25  
9,40,41



Use the symmetry of isosceles triangles!

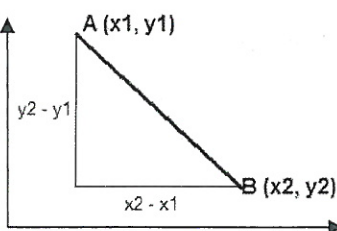


## On the Coordinate Plane

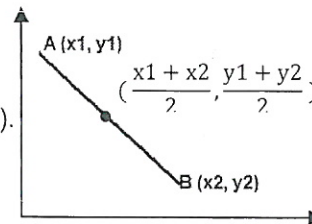
If you forget the distance or midpoint formula, start by plotting the two points you are given (a quick sketch!).

For distance, use the Pythagorean Theorem:

$$AB^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$



For midpoint, remember that the x-coordinate of the midpoint is exactly in the middle of the x-coordinates of the endpoints (and the same for y).



The equation of a circle with center  $(h, k)$  and radius  $r$  is  $(x - h)^2 + (y - k)^2 = r^2$ .

## Similar Triangles and Polygons

If two polygons are similar then all corresponding angles are congruent and all corresponding sides are proportional.

## Common and Important Formulas

Circumference of circle =  $\pi d$

Area of circle =  $\pi r^2$

Area of a parallelogram =  $bh$

Area of a triangle =  $\frac{1}{2}bh$

The height must be perpendicular to the base!

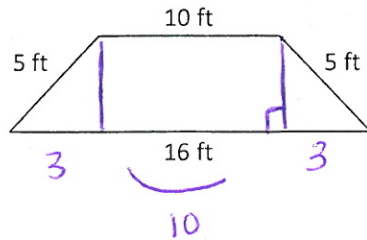
If the height is not given, look for a right triangle and use the Pythagorean Theorem.

Surface area of a 3D figure: find the area of each side and add.

# Geometry Practice

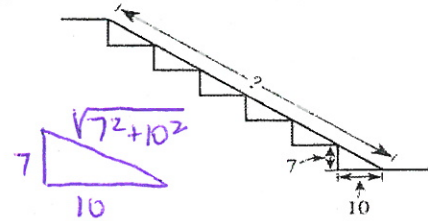
1. The parallel sides of the isosceles trapezoid shown below are 10 feet long and 16 feet long, respectively. What is the distance, in feet, between these 2 sides?

- A. 3
- ☒ B. 4
- C. 5
- D. 10
- E. 16



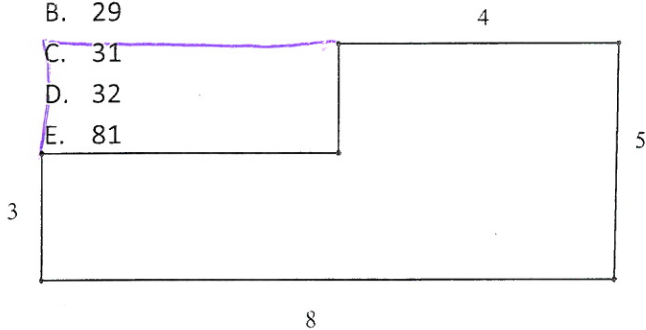
2. A moving company uses a plank on a staircase from the top of a staircase to the floor to allow them to move a heavy desk. As shown in the figure below, each stair is 7 inches high and 10 inches deep. Which of the following is closest to the length, in inches, of the plank?

- A. 42
- B. 48
- ☒ C. 73
- D. 102
- E. 252



3. In the figure, all of the line segments are either horizontal or vertical, as shown, and the dimensions are given in centimeters. What is the perimeter, in centimeters of the figure?

- ☒ A. 26
- B. 29
- C. 31
- D. 32
- E. 81



4. Given below are 4 true if-then statements involving pairs of the 5 statements A, B, C, D, and E.

- If A is true, then C is true.
- If D is true, then E is true.
- If A is true, then D is true.
- If E is true, then B is true.

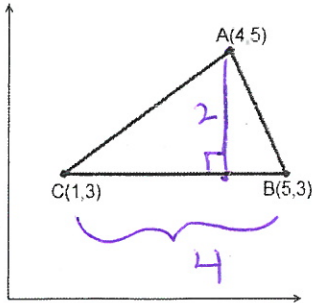
If A is true, then which of the following lists gives all the other statements that are necessarily true?

- ☒ A. B, C, D, and E
- B. B, D, and E
- C. B and E
- D. C and D
- E. C, D, and E

Handwritten purple logic:  $A \rightarrow C$   
 $A \rightarrow D \rightarrow E \rightarrow B$

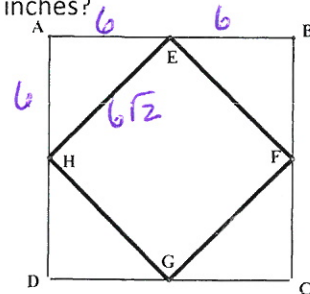
5. In the figure below, the vertices of  $\triangle ABC$  have  $(x, y)$  coordinates  $(4, 5)$ ,  $(5, 3)$ , and  $(1, 3)$ , respectively. What is the area of  $\triangle ABC$ ?

- ☒ A. 4
- B.  $4\sqrt{2}$
- C.  $4\sqrt{3}$
- D. 8
- E.  $8\sqrt{2}$



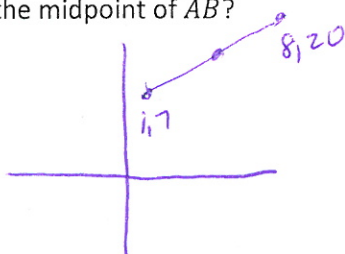
6. In the figure below, ABCD is a square and E, F, G, and H are the midpoints of its sides. If  $AB = 12$  inches, what is the perimeter of EFGH, in inches?

- A. 24
- ☒ B.  $24\sqrt{2}$
- C.  $36\sqrt{2}$
- D.  $48\sqrt{2}$
- E. 72



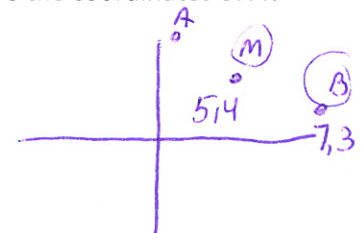
7. In the standard  $(x, y)$  coordinate plane, point A has coordinates of  $(1, 7)$  and point B has coordinates of  $(8, 20)$ . What are the coordinates of the midpoint of  $\overline{AB}$ ?

- A.  $(8, 27)$
- B.  $(3.5, 6.5)$
- C.  $(4, 14)$
- D.  $(-6, -6)$
- ☒ E.  $(4.5, 13.5)$



8. In the standard  $(x, y)$  coordinate plane, point M with coordinates  $(5, 4)$  is the midpoint of  $\overline{AB}$ , and B has coordinates  $(7, 3)$ . What are the coordinates of A?

- F.  $(17, 11)$
- G.  $(9, 2)$
- H.  $(6, 3.5)$
- ☒ J.  $(3, 5)$
- K.  $(-3, -5)$



Handwritten purple calculations:  
 $\frac{1+8}{2}$   
 $\frac{7+20}{2}$

How are problems 7 and 8 different?

Handwritten purple equations:  
 $\frac{7+x}{2} = 5$   
 $\frac{3+y}{2} = 5$   
 7