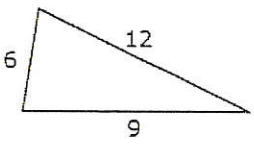
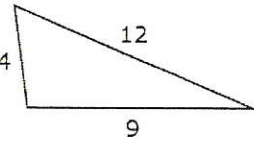
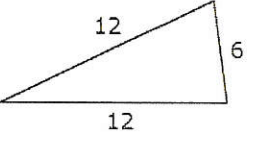
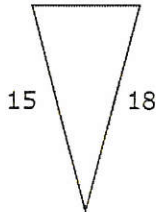
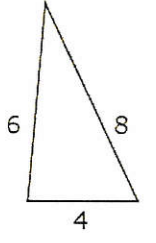


HW: Sage Practice #3

Name Key

1.

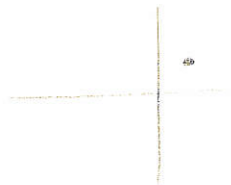
<p>Identify the triangle that is similar to the triangle shown.</p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">  </div> <div style="margin-bottom: 20px;"> <p>(A) </p> </div> <div> <p>(B) </p> </div> </div> <div style="margin-top: 20px; text-align: right;"> <p>$\frac{6}{4} = \frac{12}{12}$</p> <p>$\frac{6}{6} = \frac{12}{12}$</p> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;"> <p>(C) </p> </div> <div> <p>(D) </p> </div> </div> <div style="margin-top: 20px; text-align: right;"> <p>$\frac{6}{12} = \frac{12}{18}$</p> <p>$\frac{1}{2} = \frac{2}{3}$</p> <p>$\frac{6}{4} = \frac{12}{8}$</p> <p>$\frac{3}{2} = \frac{3}{2}$</p> </div>
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2. Hannah alters a triangle by this sequence of transformations.

- I. Rotation by 180°
- II. Dilation by a factor of 2
- III. Reflection across one of its sides
- IV. Vertical stretch by a factor of 3

What is the first step in the sequence in which the new triangle loses similarity to the original triangle?

- (A) I
- (B) II
- (C) III
- (D) IV



3. A line segment from point A to point B is 3 units long. The plane is dilated by a factor of $\frac{1}{3}$ with the center of dilation at the point (1, 1). What is the length of the dilated line segment?

What is the length of the dilated line segment $\overline{A'B'}$?

- (A) 1 unit
- (B) 3 units
- (C) 9 units
- (D) It depends on the location of the original points.

4.

A segment measuring 6 units is dilated by a factor of $\frac{3}{4}$.

What is the length of the new segment?

- (A) $4\frac{1}{2}$ units
- (B) $5\frac{1}{4}$ units
- (C) $6\frac{3}{4}$ units
- (D) 8 units

5.

Two triangles have two pairs of congruent angles. Which of the following must also be true?

- I. They are similar.
- II. There is a rigid motion that transforms one to the other.
- III. They share at least one side length.

- A. I only
- B. I and II only
- C. I and III only
- D. I, II, and III

6.

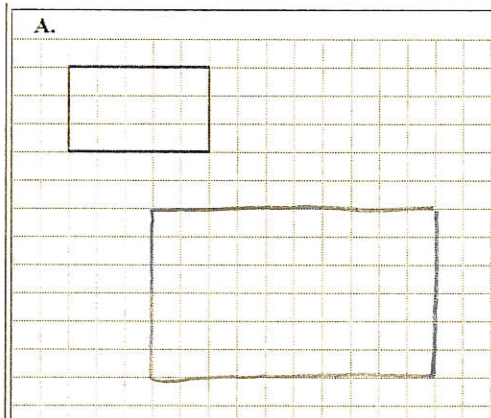
1

A. Sketch one figure that is similar to but not congruent to the given figure.

B. What is the scale factor from the original figure to the figure you sketched?

2
3
4
5
6
7
8
9

A.



B.

scale factor = $\frac{2}{1}$

7.

What is the **least** amount of information needed to show that two triangles are similar?

- A. one side and one angle from each triangle
- B. two angles from each triangle
- C. two angles and the included side from each triangle
- D. all three angles from each triangle

8.

1

The 12-foot flagpole shown casts a shadow that is $3\frac{1}{2}$ feet long. Nearby are an 18-foot-tall tree and a 30-foot-tall building.

Place digits in the boxes to show the lengths of the other two shadows.

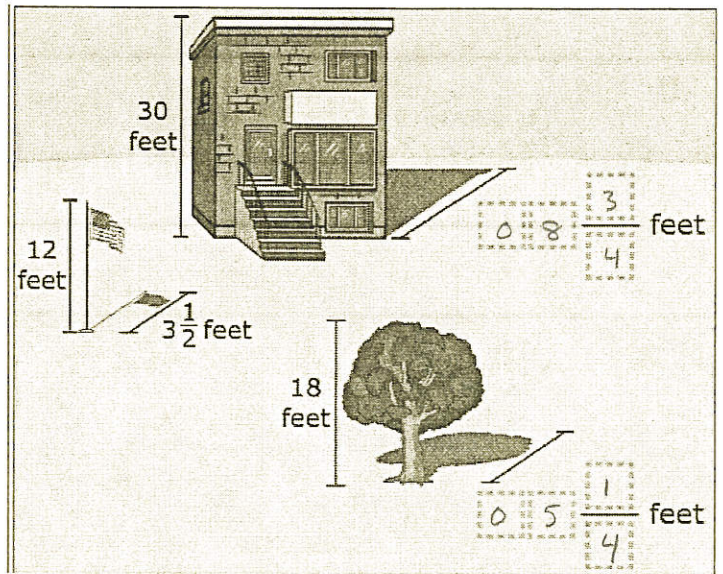
$$\frac{12}{18} = \frac{3.5}{x}$$

$$12x = 63$$

$$x = \frac{63}{12}$$

$$5.25$$

1
2
3
4
5
6
7
8
9



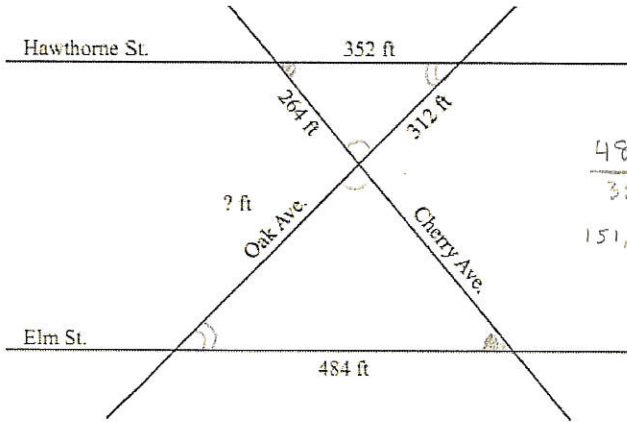
9.

$$\frac{12}{30} = \frac{3.5}{x}$$

$$12x = 105$$

$$x = 8.75$$

Hawthorne Street and Elm Street are parallel to each other in the map shown.



$$\frac{484}{352} = \frac{x}{312}$$

$$151,008 = 352x$$

$$429 = x$$

- (A) 312 feet
- (B) 363 feet
- (C) 429 feet
- (D) 444 feet

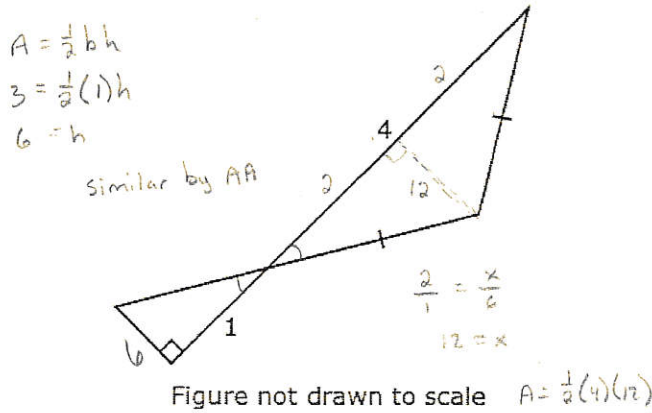
How far, in feet, is the intersection of Elm Street and Oak Avenue from the intersection of Oak Avenue and Cherry Avenue?

10. Xavier cannot walk directly from point A to point B. Instead, he starts by walking at an angle of 30° from the direct path, then makes a 90° turn, and finally walks 40 ft to reach his destination? If Xavier were able to take a direct path, how far would he walk?

- (A) 20 feet
- (B) $40\sqrt{2}$ feet
- (C) $40\sqrt{3}$ feet
- (D) 80 feet



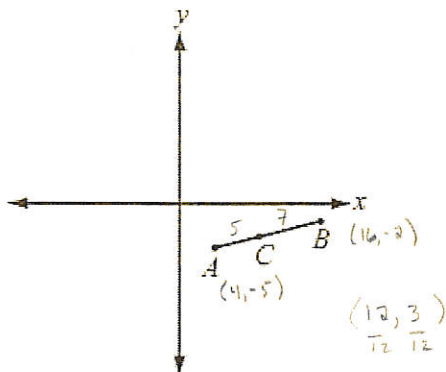
11. In the figure shown, the area of the right triangle is 3 square units.



What is the area of the isosceles triangle?

- (A) 6 square units
- (B) 12 square units
- (C) 24 square units
- (D) 48 square units

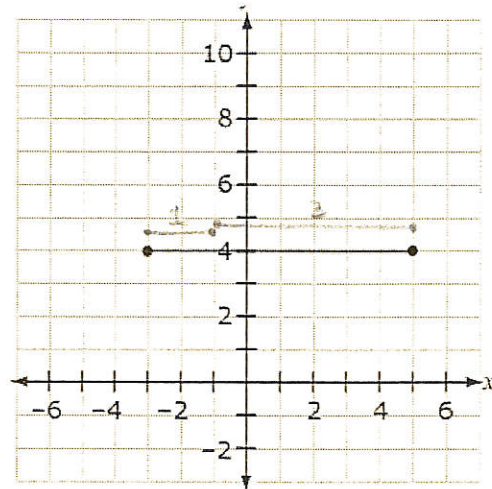
12. For the following image, the coordinates of A and B are: A(4, -5) and B(16, -2).



The ratio of $AC:CB$ is 5:7. multiply by 5 ($5, \frac{5}{4}$)
 add to A
 What are the coordinates of point C?

- (A) (5, -1.25)
- (B) (9, -3.75)
- (C) (11, -3.25)
- (D) (12.57, -2.86)

13. Use the Draw Point tool to draw a point that partitions the segment into an exact 1:3 ratio. Then fill each circle with a positive or negative and each box with a digit 0-9 to display the exact coordinates of the point.



Coordinate of the point drawn above:

(,)

14. $\triangle ABC$ is a right triangle with $m\angle C = 90^\circ$. Use the relationships in the triangle to create two true statements.

$\cos A = \sin B$
 $\cos B = \sin A$

15.

Given that $\sin(\theta) = \frac{4}{5}$ in Quadrant II, find $\cos(\theta)$.

- A $-\frac{3}{5}$
- B $-\frac{1}{5}$
- C $\frac{1}{5}$
- D $\frac{3}{5}$



17.

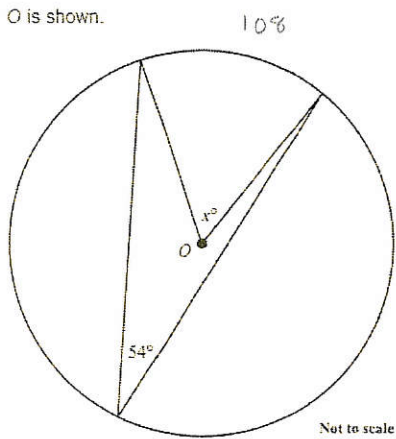
Given that $\cos(\theta) = \frac{2}{3}$ in Quadrant IV, find $\tan(\theta)$.

- A $-\frac{1}{2}$
- B $-\frac{\sqrt{5}}{3}$
- C $-\frac{\sqrt{5}}{2}$
- D $-\frac{2}{\sqrt{5}}$



16.

Circle O is shown.

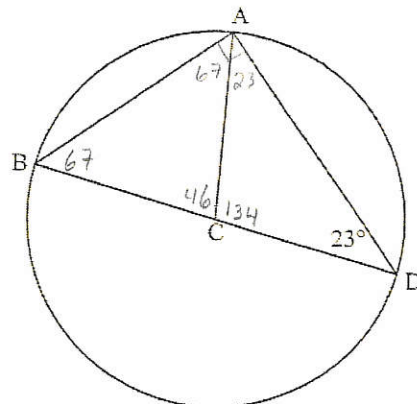


Not to scale

What is the value of x ?

- A 27
- B 54
- C 108
- D 126

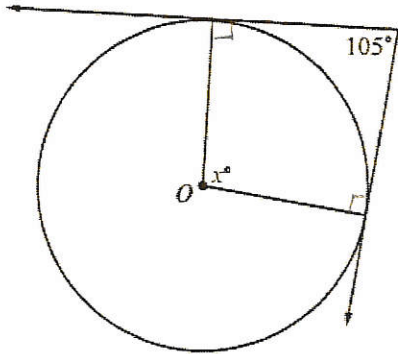
18. The following circle has center C and inscribed triangle ABC.



What is the measure of $\angle ACB$?

- A 23°
- B 46°
- C 67°
- D 134°

19. Circle O is shown.



Not to scale

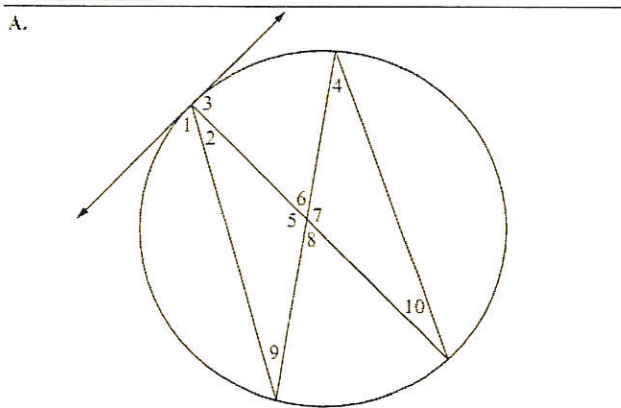
What is the value of x ?

- (A) 37.5
- (B) 52.5
- (C) 75
- (D) 105

20. A. Select the inscribed angles in the figure by clicking the number on the angle. 7.

$\angle 2, \angle 4, \angle 9, \angle 10$

B. Place one number in each box to show 3 different pairs of congruent angles.



B.

- ① $\angle 2 \cong \angle 4$ ② $\angle 9 \cong \angle 10$ ③ $\angle 5 \cong \angle 7$

21. A circle has a diameter of 18 inches and is divided into 6 equal sectors. What is the perimeter of each sector?

- (A) $9 + 3\pi$
- (B) $18 + 3\pi$
- (C) $18 + 6\pi$
- (D) $36 + 6\pi$



$$\frac{1}{6} (2\pi(9))$$

$$3\pi$$

22. A circle has a radius of 4.5 inches. The length of an arc in this circle is intercepted by a central angle that measures 90° . What is the approximate length of the arc, in inches?

- (A) 3
- (B) 7
- (C) 14
- (D) 32



$$\frac{1}{4} (2\pi(4.5))$$

$$7$$

23. A circle has a radius of 16 cm and is divided into equal sectors, each with a radian measure of $\frac{\pi}{4}$. What is the area of each sector?

- (A) $2\pi \text{ cm}^2$
- (B) $4\pi \text{ cm}^2$
- (C) $32\pi \text{ cm}^2$
- (D) $64\pi \text{ cm}^2$



$$\frac{1}{8} (\pi (16)^2)$$

$$32\pi$$

24. One method of estimating the area of a circle is as follows:

- A regular polygon circumscribes the circle.
- A similar regular polygon is inscribed the circle.
- The area of the circle is greater than the inscribed polygon, but less than the circumscribed polygon.
- The area of the circle will be close to the average area of the large and small polygons.

Using this method, which polygon will give the closest estimate of the area of the circle?

- (A) triangle
- (B) square
- (C) pentagon
- (D) hexagon

25. A cylindrical container of canned food has a diameter of 3 inches and a height of 4.5 inches. What is the volume of the can?

- (A) $6.75\pi \text{ in.}^3$
- (B) $10.125\pi \text{ in.}^3$
- (C) $40.5\pi \text{ in.}^3$
- (D) $45.5625\pi \text{ in.}^3$

$$\pi (1.5)^2 (4.5)$$

26. A funnel, in the shape of a perfect cone, has a circular base with a radius that is equal to its height. The funnel is filled with sand and is emptied into a cylinder with the same radius and height as the cone.



How much empty space is left over in the cylinder after it is filled with sand from the cone?

- (A) No space remains in the cylinder.
- (B) One-half of the original volume of the cylinder is empty.
- (C) One-third of the original volume of the cylinder is empty.
- (D) Two-thirds of the original volume of the cylinder is empty.

27.

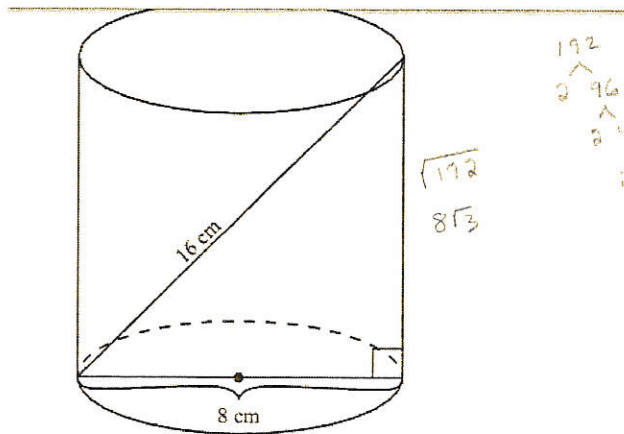
Quadrilateral WXYZ has vertices W (1, 4), X(5, 1), Y(8, 4), and Z(5, 7).

What type of quadrilateral is WXYZ?

- (A) kite
- (B) parallelogram
- (C) rhombus
- (D) square
- (E) trapezoid



28.

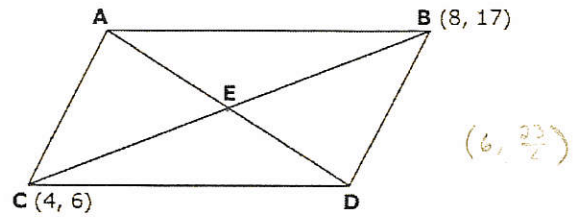


What is the volume, in cubic centimeters, of this right cylinder?

- (A) $64\sqrt{3}\pi$ cubic centimeters
- (B) $32\pi + 64\sqrt{3}\pi$ cubic centimeters
- (C) $128\sqrt{3}\pi$ cubic centimeters
- (D) $512\sqrt{3}\pi$ cubic centimeters

$\pi(4)^2(8\sqrt{3})$
 $128\sqrt{3}\pi$

29. Keily claims this figure is a parallelogram.



If she is correct, what are the coordinates of point E?

- (A) $(2, \frac{11}{2})$
- (B) $(\frac{11}{2}, 2)$
- (C) $(6, \frac{23}{2})$
- (D) $(\frac{23}{2}, 6)$

30. Given segment \overline{AB} with midpoint C, a line through C perpendicular to \overline{AB} extends through point D. Which theorem proves that \overline{AD} is congruent to \overline{BD} ?

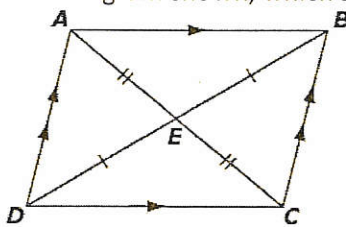
- (A) AAS
- (B) ASA
- (C) SAS
- (D) SSS



31. Which property is sufficient to prove that a parallelogram is a rectangle?

- (A) Opposite sides must be congruent.
- (B) The diagonals must bisect each other.
- (C) The diagonals must be congruent.
- (D) The diagonals must be perpendicular.

32. For the diagram shown, which statement helps prove $\triangle ABC \cong \triangle CDB$?



- (A) Diagonals of a parallelogram bisect each other.
- (B) Opposite sides of a parallelogram are congruent.
- (C) Corresponding parts of congruent triangles are congruent.
- (D) Alternate interior angles formed by parallel lines and a transversal are congruent.