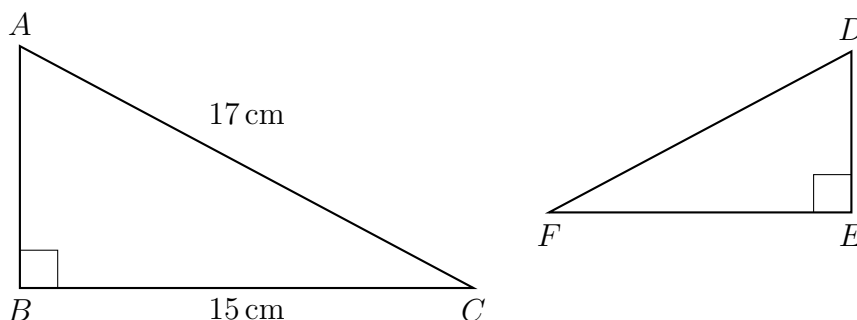


Regents review and practice

January 2020

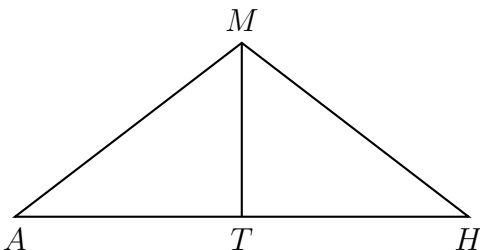
1. A cone has a volume of 108π and a base diameter of 12. What is the height of the cone?
2. The endpoints of directed line segment PQ have coordinates of $P(-7, -5)$ and $Q(5, 3)$. What are the coordinates of point A , on \overline{PQ} , that divide \overline{PQ} into a ratio of 1:3?
3. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.



If $\triangle ABC \sim \triangle DEF$, with right angles B and E , $BC = 15\text{ cm}$, and $AC = 17\text{ cm}$, what is the measure of $\angle F$, to the *nearest degree*?

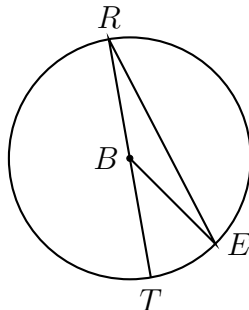
4. Jaden is comparing two cones. The radius of the base of cone A is twice as large as the radius of the base of cone B. The height of cone B is twice the height of cone A. The volume of cone A is
 - (a) twice the volume of cone B
 - (b) four times the volume of cone B
 - (c) equal to the volume of cone B
 - (d) equal to half the volume of cone B
5. A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?
 - (a) 45°
 - (b) 90°
 - (c) 120°
 - (d) 135°

6. In triangle MAH below, \overline{MT} is the perpendicular bisector of \overline{AH} .



Which statement is *not* always true?

- (a) $\triangle MAH$ is isosceles.
 - (b) $\triangle MAT$ is isosceles.
 - (c) \overline{MT} bisects $\angle AMH$.
 - (d) $\angle A$ and $\angle TMH$ are complementary.
7. In circle B below, diameter \overline{RT} , radius \overline{BE} , and chord \overline{RE} are drawn.



- It $m\angle TRE = 15^\circ$ and $BE = 9$, then the area of sector EBR is what in terms of π ?
8. Lou has a solid clay brick in the shape of a rectangular prism with a length of 8 inches, a width of 3.5 inches, and a height of 2.25 inches. If the clay weighs 1.055 oz/in^3 , how much does Lou's brick weigh, to the nearest ounce?
9. For the acute angles in a right triangle, $\sin(4x)^\circ = \cos(3x + 13)^\circ$.
What is the number of degrees in the measure of the smaller angle?

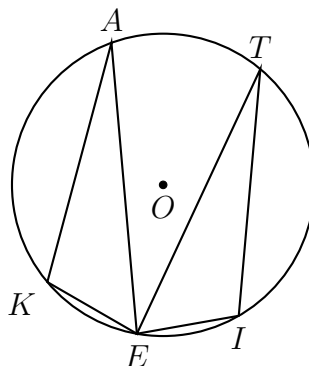
Name:

10. A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.
11. Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point $(5, 12)$.

Regents review and practice

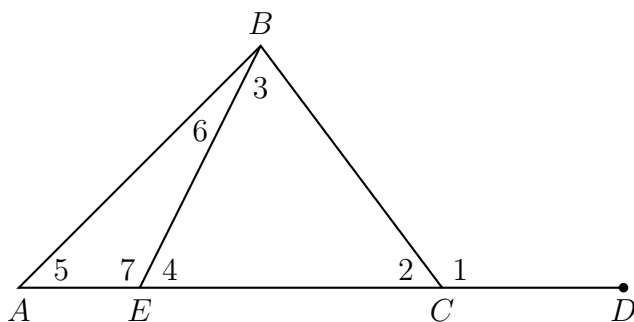
January 2019

12. After a dilation with center $(0, 0)$, the image of \overline{DB} is $\overline{D'B'}$. If $DB = 4.5$ and $D'B' = 18$, then what is the scale factor of this dilation?
13. In the diagram below of circle O , points K, A, T, I , and E are on the circle, $\triangle KAE$ and $\triangle ITE$ are drawn, $\widehat{KE} \cong \widehat{EI}$, and $\angle EKA \cong \angle EIT$.



- Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
- (a) They are neither congruent nor similar.
 - (b) They are similar but not congruent.
 - (c) They are right triangles.
 - (d) They are congruent.
14. From a point on the ground one-half mile from the base of a historic monument, the angle of elevation to its top is 11.87° . To the nearest foot, what is the height of the monument? (1 mile = 5280 feet)
 15. The area of a sector of a circle with a radius measuring 15 cm is 75π cm². What is the measure of the central angle that forms the sector?
 16. Point M divides \overline{AB} so that $AM : MB = 1 : 2$. If A has coordinates $(-1, -3)$ and B has coordinates $(8, 9)$, what are the coordinates of M ?

17. In right triangle ABC , $m\angle C = 90^\circ$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?
- (a) $\cos A$ (c) $\tan A$
 (b) $\cos B$ (d) $\tan B$
18. What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?
19. Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?
- (a) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
 (b) a rectangular prism with a length of 6 inches, width of 5 inches, and height of 5 inches
 (c) a cylinder with a radius of 5 inches and a height of 6 inches
 (d) a cylinder with a radius of 6 inches and a height of 5 inches
20. In the diagram below of triangle ABC , \overline{AC} is extended through point C to point D , and \overline{BE} is drawn to \overline{AC} .



Which equation is always true?

- (a) $\angle 1 = m\angle 3 + m\angle 2$ (c) $\angle 6 = m\angle 3 - m\angle 2$
 (b) $\angle 5 = m\angle 3 - m\angle 2$ (d) $\angle 7 = m\angle 3 + m\angle 2$

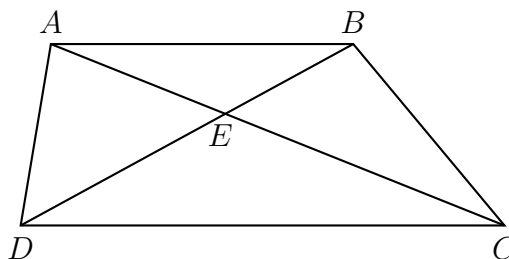
Similarity

January 2020

21. Triangle JGR is similar to triangle MST . Which statement is *not* always true?

- (a) $\angle J \cong \angle M$ (c) $\angle R \cong \angle T$
(b) $\angle G \cong \angle T$ (d) $\angle G \cong \angle S$

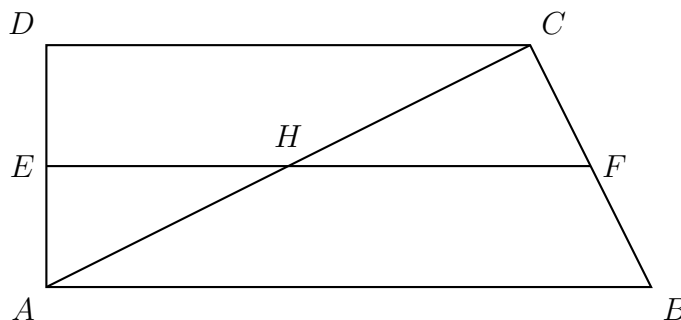
22. In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.



If $AE = 5.2$, $AC = 11.7$, and $CD = 10.5$, what is the length of \overline{AB} , to the nearest tenth?

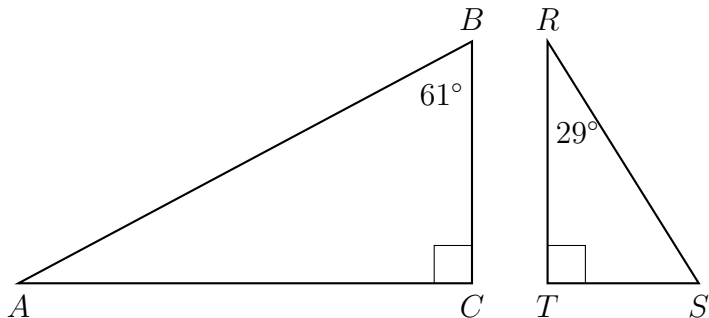
23. The line represented by $2y = x + 8$ is dilated by a scale factor of k centered at the origin, such that the image of the line has an equation of $y - \frac{1}{2}x = 2$. What is the scale factor?

24. In quadrilateral $ABCD$ below, $\overline{AB} \parallel \overline{CD}$, and E , H , and F are the midpoints of \overline{AD} , \overline{AC} , and \overline{BC} , respectively.



If $AB = 24$, $CD = 18$, and $AH = 10$, then what is FH ?

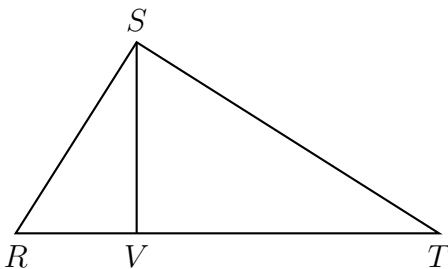
25. Given right triangle ABC with a right angle at C , $m\angle B = 61^\circ$. Given right triangle RST with a right angle at T , $m\angle R = 29^\circ$.



Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

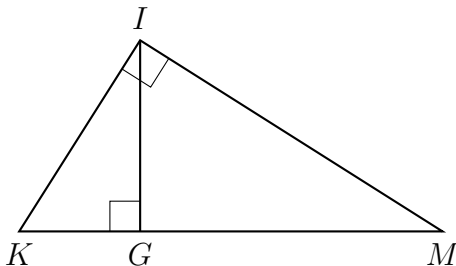
- (a) $\frac{AB}{RS} = \frac{RT}{AC}$ (c) $\frac{BC}{ST} = \frac{AC}{RT}$
 (b) $\frac{BC}{ST} = \frac{AB}{RS}$ (d) $\frac{AB}{AC} = \frac{RS}{RT}$

26. In right triangle RST below, altitude \overline{SV} is drawn to hypotenuse \overline{RT} .



If $RV = 4.1$ and $TV = 10.2$, what is the length of \overline{ST} , to the *nearest tenth*?

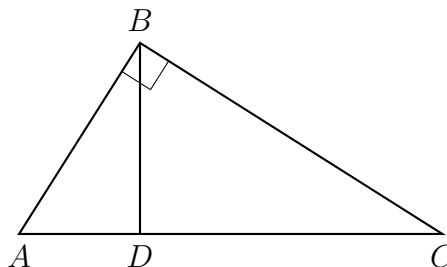
27. In the diagram below of right triangle KMI , altitude \overline{IG} is drawn to hypotenuse \overline{KM} .



If $KG = 9$ and $IG = 12$, what is the length of \overline{IM} ?

Name:

28. In diagram below of right triangle ABC , altitude \overline{BD} is drawn.



Which ratio is always equivalent to $\cos A$?

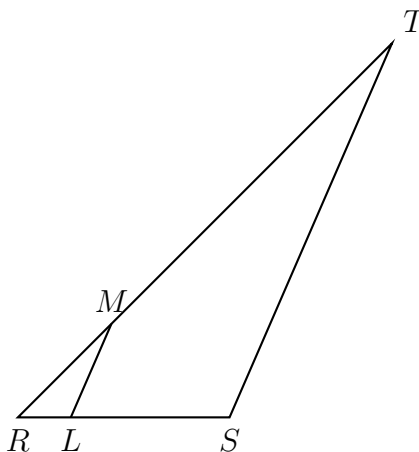
(a) $\frac{AB}{BC}$

(c) $\frac{BD}{AB}$

(b) $\frac{BD}{BC}$

(d) $\frac{BC}{AC}$

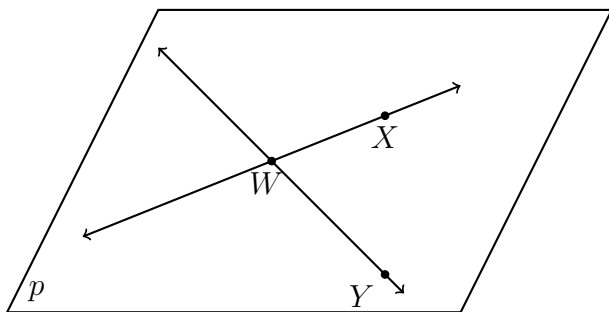
29. In the diagram below of $\triangle RST$, L is a point on \overline{RS} , and M is a point on \overline{RT} , such that $\overline{LM} \parallel \overline{ST}$.



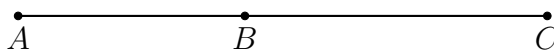
IF $RL = 2$, $LS = 6$, $LM = 4$, and $ST = x + 2$, what is the length of \overline{ST} ?

30. Points that are all located on the same plane are _____.

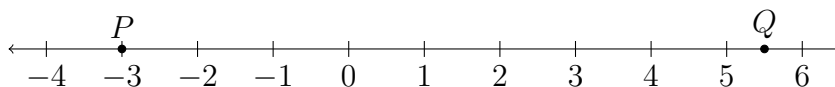
31. Identify three points in the given plane.



32. Given \overline{ABC} , $AB = 3x - 4$, $BC = x + 5$, $AC = 13$. Find BC .
Check your answer for full credit.

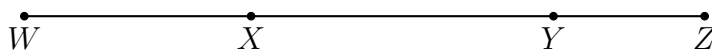


33. Given \overleftrightarrow{PQ} as shown on the number line, with $P = -3$ and $Q = 5.5$.



What is the exact distance on the number line between the points P and Q ?

34. Given \overline{WXYZ} , $WX = 3\frac{1}{2}$, $XY = 4\frac{3}{4}$, and $YZ = 1\frac{1}{4}$.
Find WZ .



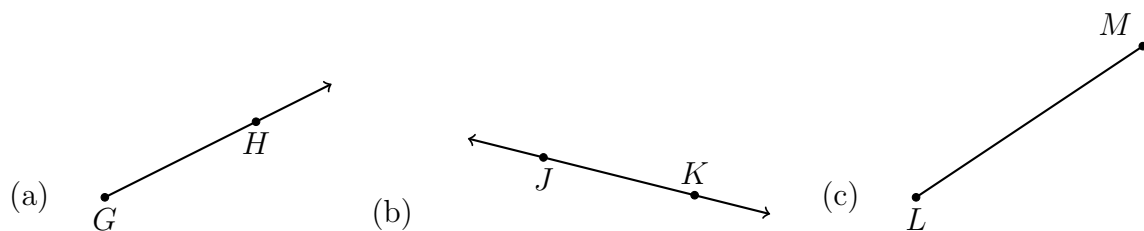
35. Given the points V and W , draw \overrightarrow{WV} .

Name: _____

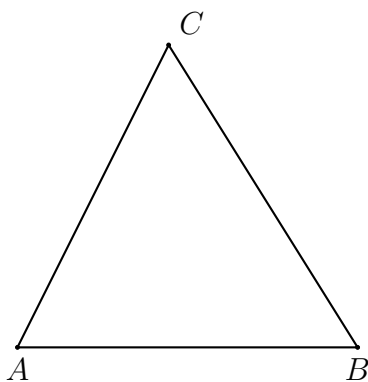
\dot{V}

\dot{W}

36. Use symbols to write the name of each geometric figure.



37. Given $\triangle ABC$ with $\overline{AB} \cong \overline{AC}$. On the diagram mark the congruent line segments with tick marks.

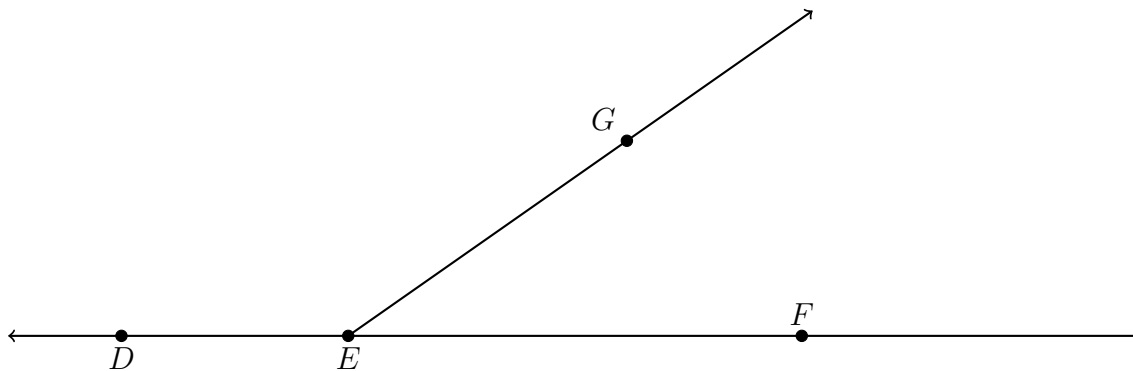


38. Find the measure of the angle in degrees and the given segment's length in centimeters.

(a) $m\angle GEF =$ _____

(b) $EG =$ _____

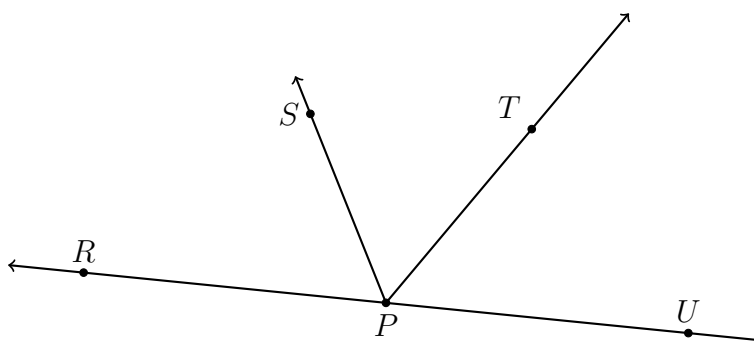
(c) Name a pair of opposite rays: _____



39. Use each term according to its geometric meaning: “sketch”, “draw”, “construct”.

- (a) _____ is to make a freehand diagram showing important features.
- (b) _____ is to depict with accurate measures using ruler, protractor, and compass.
- (c) _____ is a formal, logical process to create geometric figures using only a straightedge and compass.

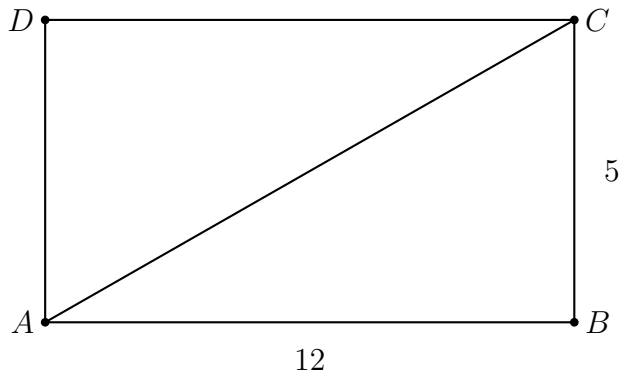
40. Given the situation in the diagram, answer each question. Circle True or False.



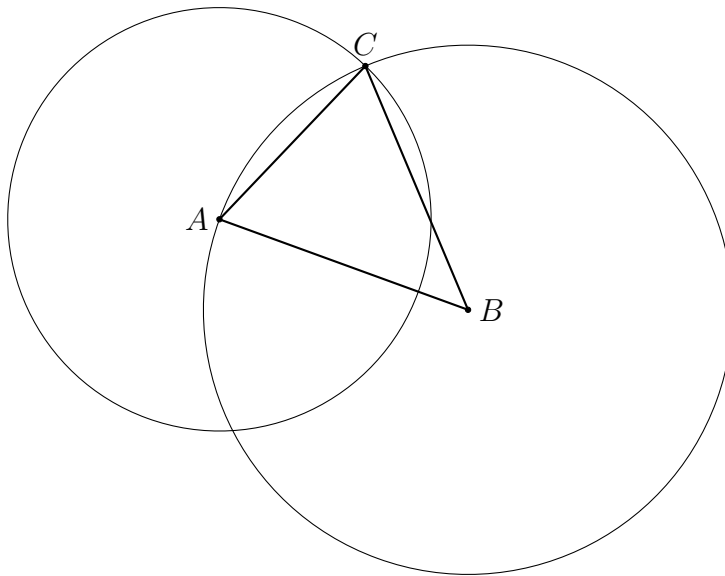
- (a) True or False: \overrightarrow{PR} and \overrightarrow{PU} are opposite rays.
- (b) True or False: $\angle TPR$ is an obtuse angle.
- (c) True or False: $\angle RPS$ and $\angle TPU$ are adjacent angles.

41. Given the rectangle $ABCD$ shown below, with $AB = 12$ and $BC = 5$. The diagonal \overline{AC} is drawn to create two triangles. Find the area of the lower triangle, $\triangle ABC$.

Name:



42. A student constructs a triangle with a given side, \overline{AB} as shown below. Is $\triangle ABC$ equilateral? Justify your answer by explaining what was done incorrectly and how it should have been done.



43. In the following two problems, solve for the value of x .

(a) $3(x - 5) = -33$

(b) $3 - \frac{1}{2}x = 2$

44. In the following two problems, solve for the value of x by factoring.

(a) $x^2 + 6x = -5$

(b) $x^2 = x + 12$