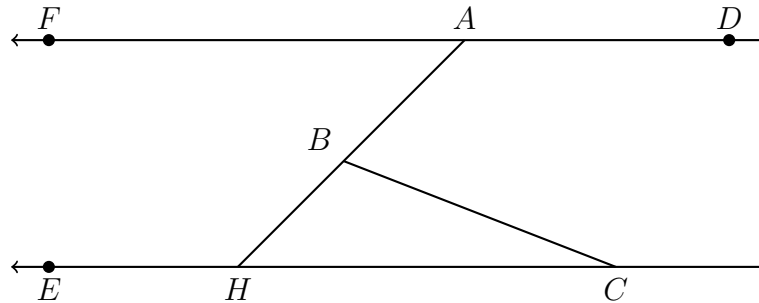


Regents review and practice

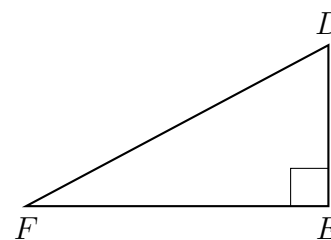
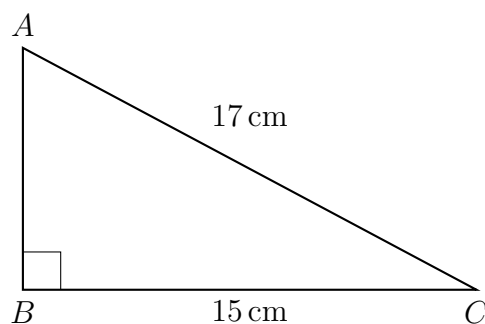
January 2020

1. In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and \overline{ABH} and \overline{BC} are drawn.



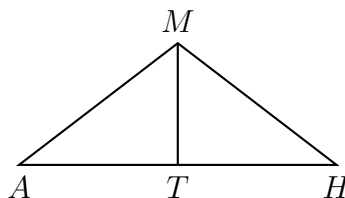
If $m\angle FAB = 48^\circ$ and $m\angle ECB = 18^\circ$, what is $m\angle ABC$?

- (a) 18° (c) 66°
(b) 48° (d) 114°
2. A cone has a volume of 108π and a base diameter of 12. What is the height of the cone?
3. The endpoints of directed line segment \overline{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?
4. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.



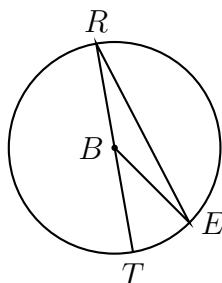
If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the nearest degree?

5. 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
6. 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°
7. 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.
8. In circle B below, diameter \overline{RT} , radius \overline{BE} , and chord \overline{RE} are drawn.



If $m\angle TRE = 15^\circ$ and $BE = 9$, then the area of sector EBR is what in terms of π ?

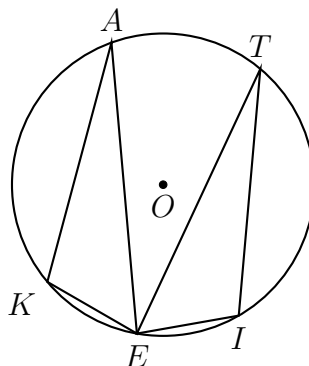
Name:

9. 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?
10. 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?
11. 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.
12. 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

13. 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?
14. 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 $\angle EKA \cong \angle EIT$.

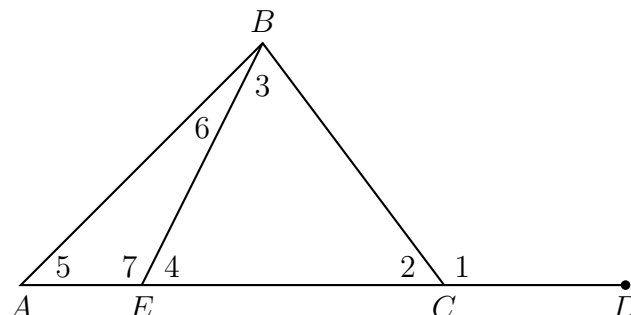


- Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?
- (a) They are neither congruent nor similar.
 - (b) They are similar but not congruent.
 - (c) They are right triangles.
 - (d) They are congruent.
15. From a point on the ground one-half mile from the base of a historic monument, 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)

16. The area of a sector of a circle with a radius measuring 15 cm is $75\pi \text{ cm}^2$. What is the measure of the central angle that forms the sector?
17. 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 ?
18. 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) $\tan B$
19. 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?
20. 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

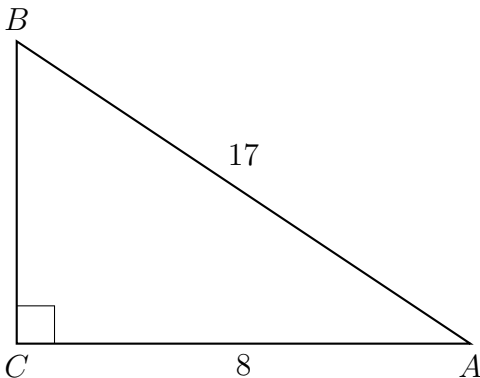
Name:

21. 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?

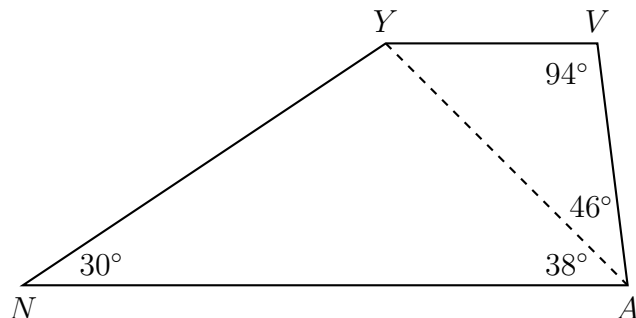
- (a) $\angle 1 = m\angle 3 + m\angle 2$ (c) $\angle 6 = m\angle 3 - m\angle 2$
(b) $\angle 5 = m\angle 3 - m\angle 2$ (d) $\angle 7 = m\angle 3 + m\angle 2$
22. In the diagram below of right triangle ABC , $AC = 8$, and $AB = 17$.



Which equation would determine the value of angle A ?

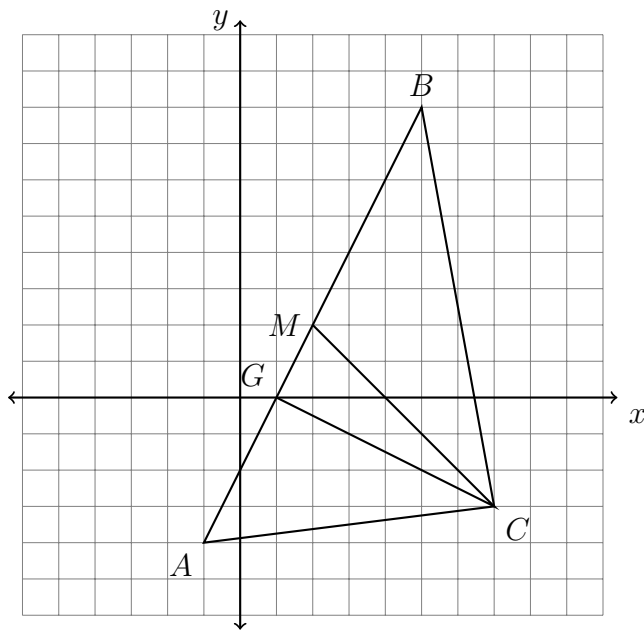
- (a) $\sin A = \frac{8}{17}$ (c) $\cos A = \frac{15}{17}$
(b) $\tan A = \frac{8}{15}$ (d) $\tan A = \frac{15}{8}$

23. In diagram of quadrilateral $NAVY$ below, $m\angle YNA = 30^\circ$, $m\angle YAN = 38^\circ$, $m\angle AVY = 94^\circ$, and $m\angle VAY = 46^\circ$.



Which segment has the shortest length?

- (a) \overline{AY} (c) \overline{VA}
 (b) \overline{NY} (d) \overline{VY}
24. In the diagram below, $\triangle ABC$, altitude \overline{CG} , and median \overline{CM} are drawn.

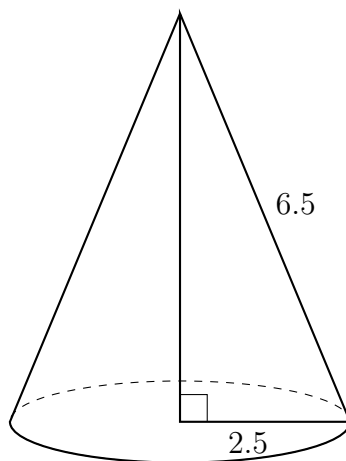


Which expression represents the area of $\triangle ABC$?

- (a) $\frac{(BC)(AC)}{2}$ (c) $\frac{(CM)(AB)}{2}$
 (b) $\frac{(GC)(BC)}{2}$ (d) $\frac{(GC)(AB)}{2}$

Name:

25. As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.

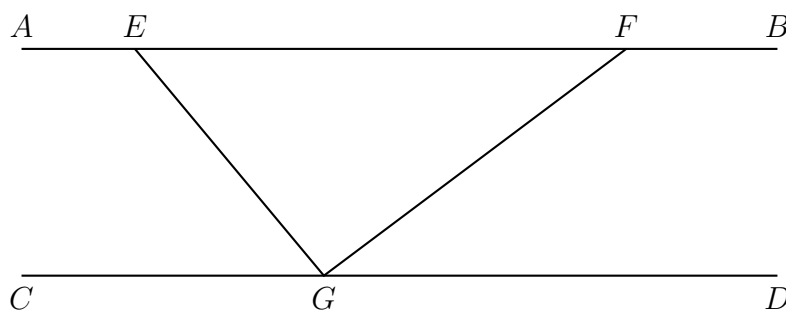


How many cubic centimeters are in the volume of the cone? Express your answer in terms of π .

Regents review and practice

August 2018

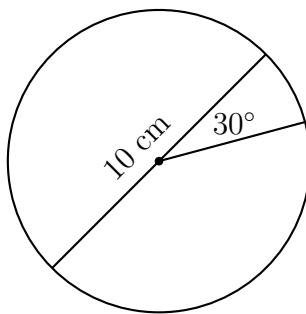
26. In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and \overline{GE} and \overline{GF} are drawn.



If $m\angle EFG = 32^\circ$ and $m\angle AEG = 137^\circ$, what is $m\angle EGF$?

- | | |
|----------------|-----------------|
| (a) 11° | (c) 75° |
| (b) 43° | (d) 105° |

27. An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a
- (a) cylinder with a diameter of 6
 - (b) cylinder with a diameter of 12
 - (c) cone with a diameter of 6
 - (d) cone with a diameter of 12
28. Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?
- (a) $3x + 2y = 12$
 - (b) $3x - 2y = 12$
 - (c) $y = \frac{3}{2}x + 2$
 - (d) $y = -\frac{2}{3}x + 4$
29. The coordinates of the endpoints of directed line segment ABC are $A(-8, 7)$ and $C(7, -13)$. If $AB : BC = 3 : 2$, what are the coordinates of B ?
30. A circle with a diameter of 10 cm and a central angle of 30° is drawn below.



- What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?
31. A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?

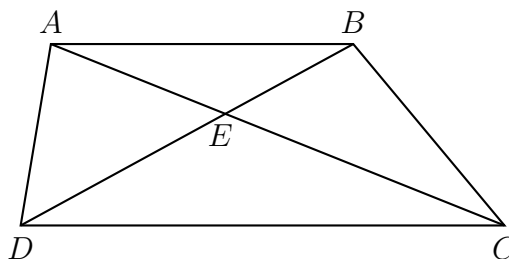
Similarity

January 2020

32. 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) $\angle G \cong \angle S$

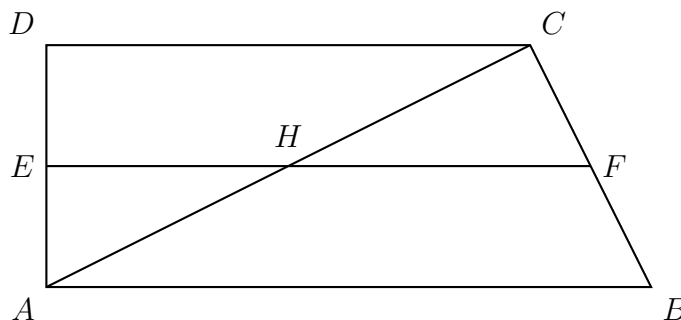
33. In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.



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

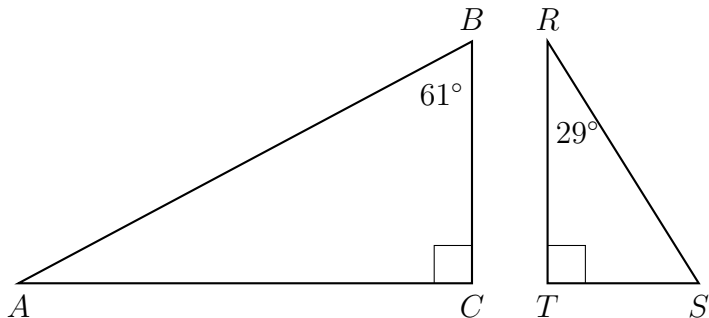
34. The line represented by $2y = x + 8$ is dilated by a scale factor of k centered at the origin, such that the image of the line has an equation of $y - \frac{1}{2}x = 2$. What is the scale factor?

35. 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 ?

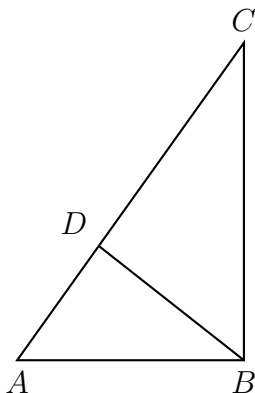
36. Given right triangle ABC with a right angle at C , $m\angle B = 61^\circ$. Given right triangle RST with a right angle at T , $m\angle R = 29^\circ$.



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) $\frac{AB}{AC} = \frac{RS}{RT}$

37. In the accompanying diagram of right triangle ABC , altitude \overline{BD} is drawn to hypotenuse \overline{AC} .

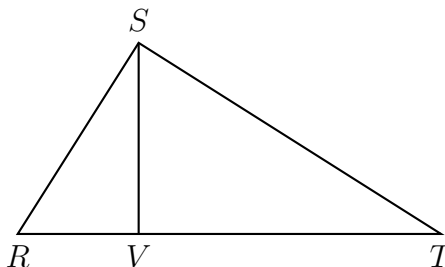


Which statement must be true?

- (a) $\frac{AD}{AB} = \frac{BC}{AC}$ (c) $\frac{BD}{BC} = \frac{AB}{AD}$
 (b) $\frac{AD}{AB} = \frac{AB}{AC}$ (d) $\frac{AB}{BC} = \frac{BD}{AC}$

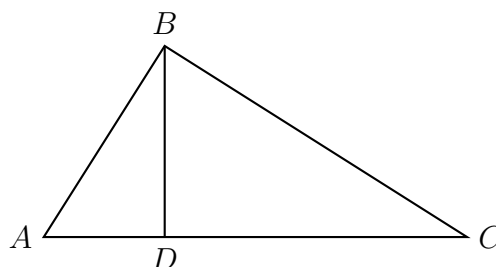
Name:

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



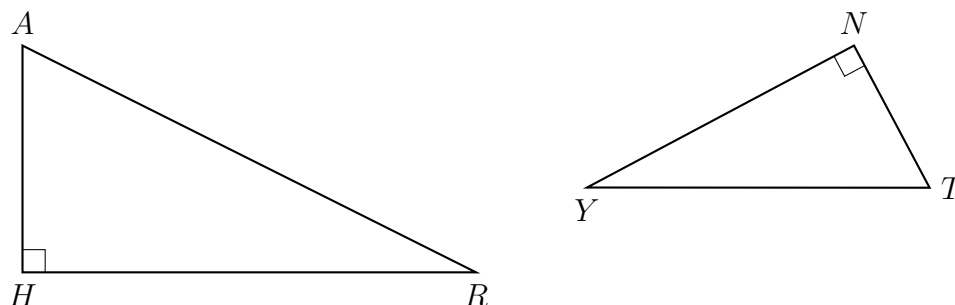
If $RV = 4.1$ and $TV = 10.2$, what is the length of \overline{ST} , to the *nearest tenth*?

39. In the diagram below of right triangle ABC , altitude \overline{BD} is drawn to hypotenuse \overline{AC} .



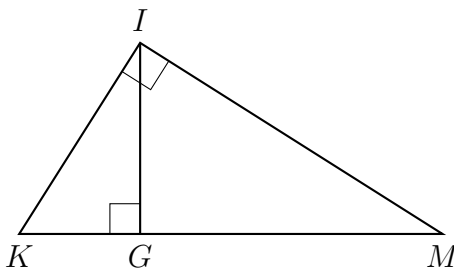
If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of \overline{CD} ?

40. In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$



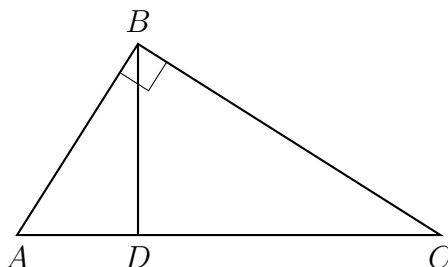
If $AR = 13$ and $HR = 12$, what is the measure of $\angle Y$, to the *nearest degree*?

41. 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} ?

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



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

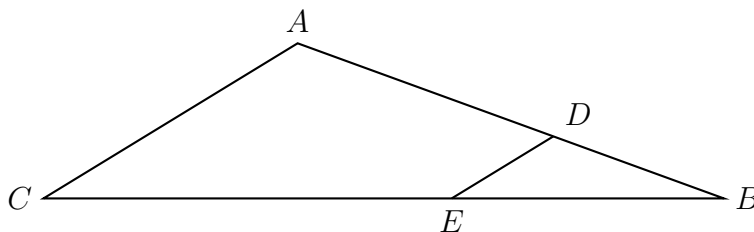
(a) $\frac{AB}{BC}$

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

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

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

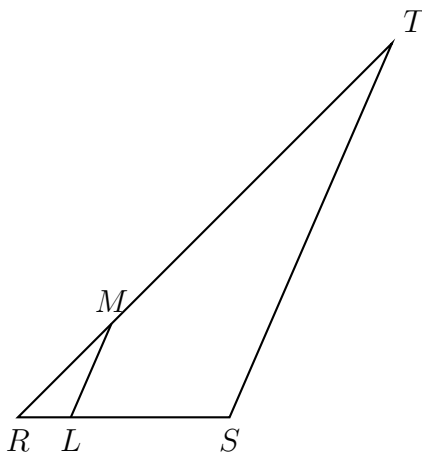
43. In the diagram of $\triangle ABC$ below, points D and E are on sides \overline{AB} and \overline{CB} respectively, such that $\overline{DE} \parallel \overline{AC}$.



IF ED is 3 more than DB , $AB = 14$, and $CB = 21$, what is the length of \overline{AD} ?

Name:

44. 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} ?

$$f(n) = \begin{cases} n/2 & \text{if } n \text{ is even} \\ -(n+1)/2 & \text{if } n \text{ is odd} \end{cases}$$