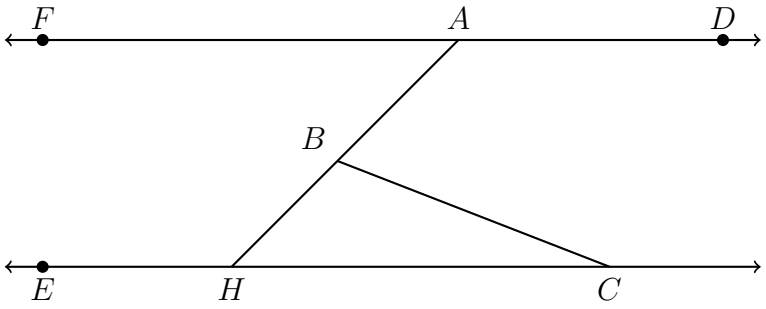
1. In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and $\overline{ABH}$ and $\overline{BC}$ are drawn.




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

(a) 18°
(b) 48°
(c) 66°
(d) 114°

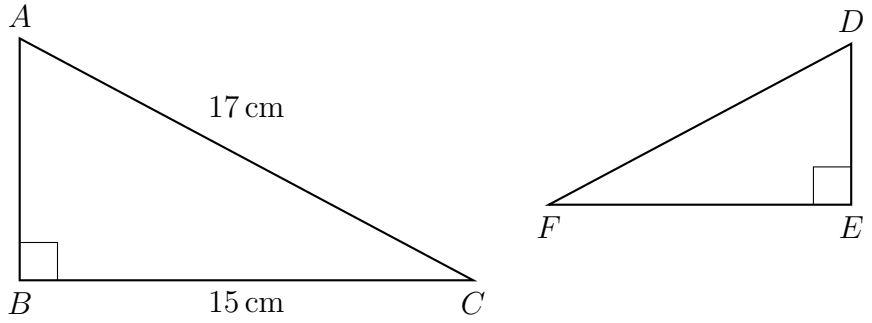
2. A cone has a volume of $108\pi$ and a base diameter of 12. What is the height of the cone?

3. 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?

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. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.

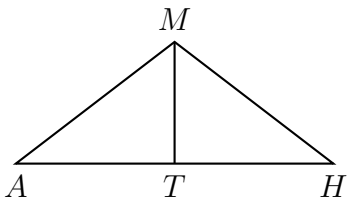



If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?

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°

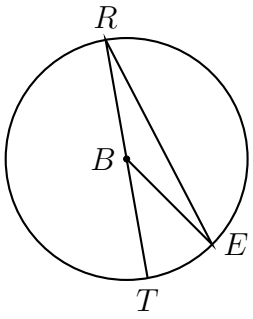
7. In triangle $MAH$ below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.




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.




It $m\angle TRE = 15°$ and $BE = 9$, then the area of sector $EBR$ is what in terms of $\pi$?

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?

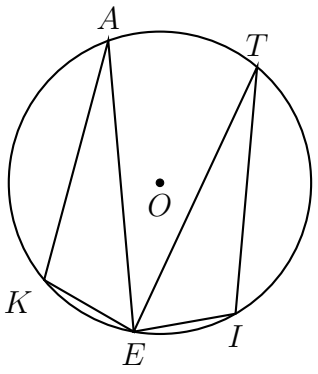
10. For the acute angles in a right triangle, $\sin(4x)° = \cos(3x + 13)°$.
What is the number of degrees in the measure of the smaller angle?

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 $(5, 12)$.

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, $\overset{\frown}{KE} \cong \overset{\frown}{EI}$, 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 $75\pi$ 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. 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?

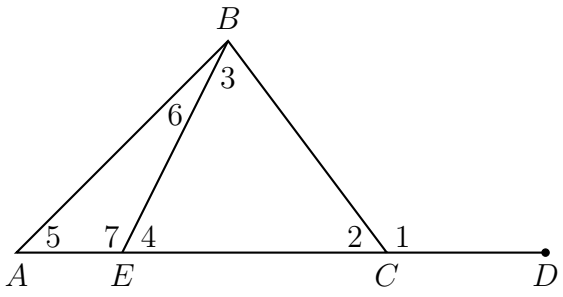
    (a) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches

    (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) $\angle 1 = m\angle 3 + m\angle 2$

(b) $\angle 5 = m\angle 3 - m\angle 2$

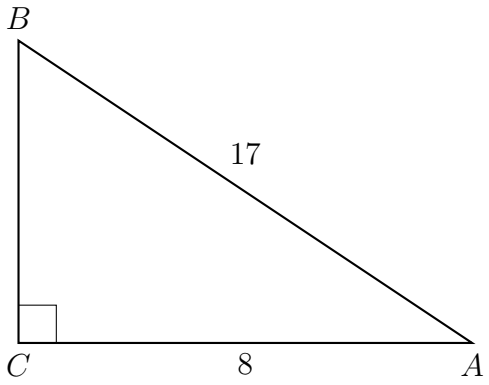
(c) $\angle 6 = m\angle 3 - m\angle 2$

(d) $\angle 7 = m\angle 3 + m\angle 2$

21. In right triangle $ABC$, $m\angle C = 90°$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?

(a) $\cos A$
(b) $\cos B$
(c) $\tan A$
(d) $\tan B$

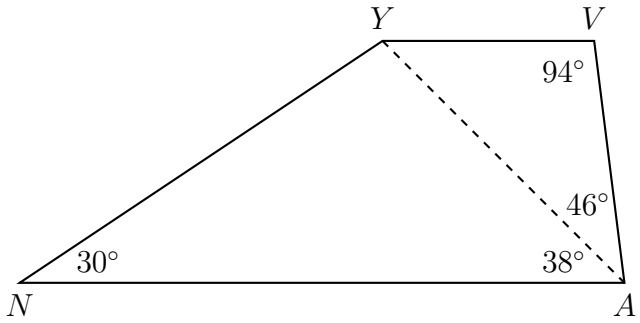
22. In the diagram below of right triangle $ABC$, $AC = 8$, and $AB = 17$.




Which equation would determine the value of angle $A$?

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

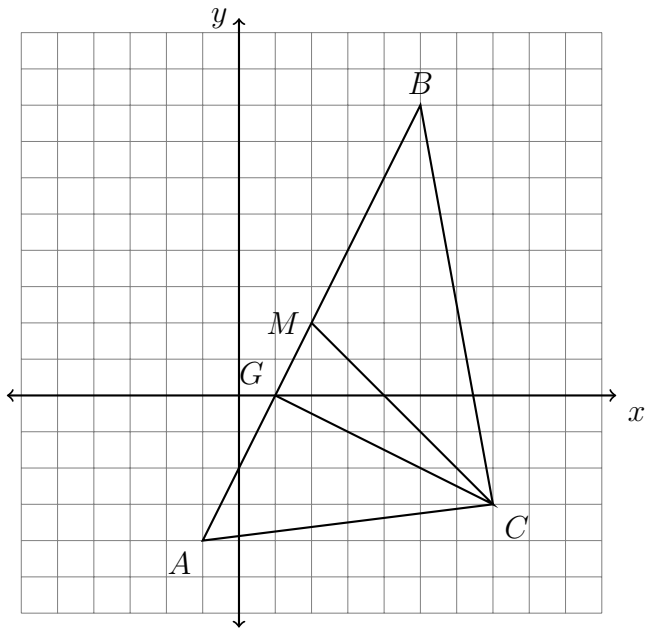
23. In diagram of quadrilateral $NAVY$ below, $m\angle YNA = 30°$, $m\angle YAN = 38°$,
$m\angle AVY = 94°$, and $m\angle VAY = 46°$.




Which segment has the shortest length?

(a) $\overline{AY}$
(b) $\overline{NY}$
(c) $\overline{VA}$
(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 $\triangle ABC$?

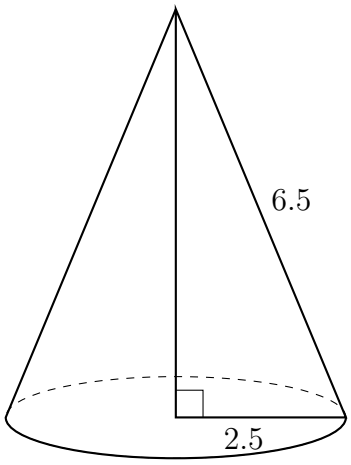
(a) $\frac{(BC)(AC)}{2}$

(b) $\frac{(GC)(BC)}{2}$

(c) $\frac{(CM)(AB)}{2}$

(d) $\frac{(GC)(AB)}{2}$

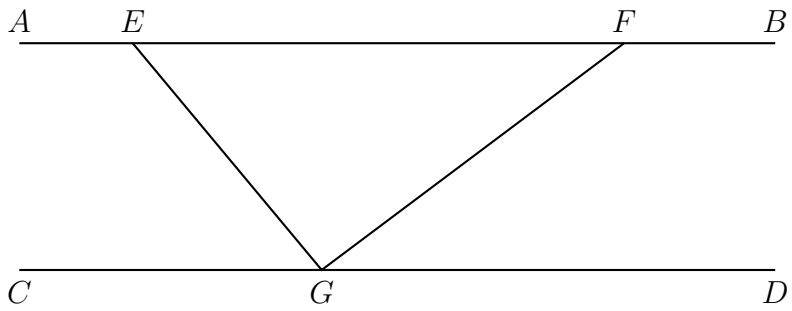
25. As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.




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

**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 $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

(a) $11°$
(b) $43°$
(c) $75°$
(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) $3x + 2y = 12$

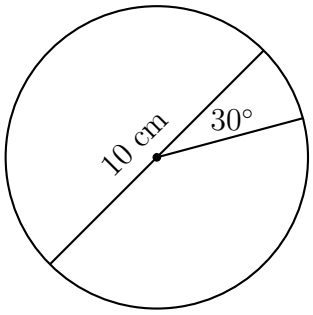
    (b) $3x - 2y = 12$

    (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.



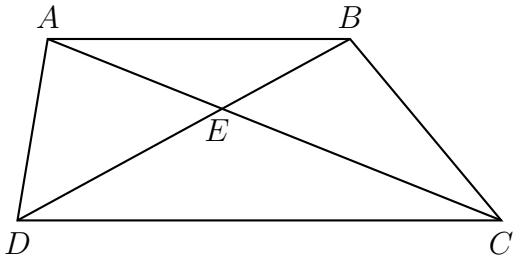

    What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

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*?

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

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

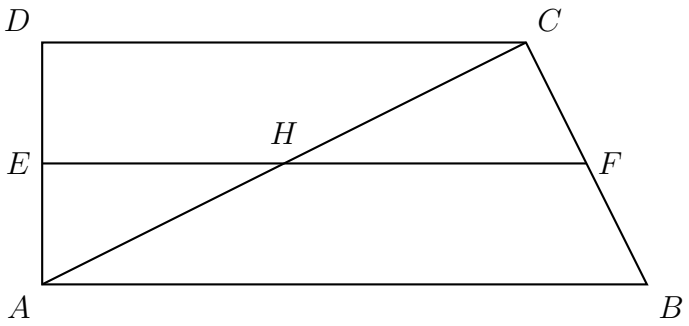
33. In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.




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

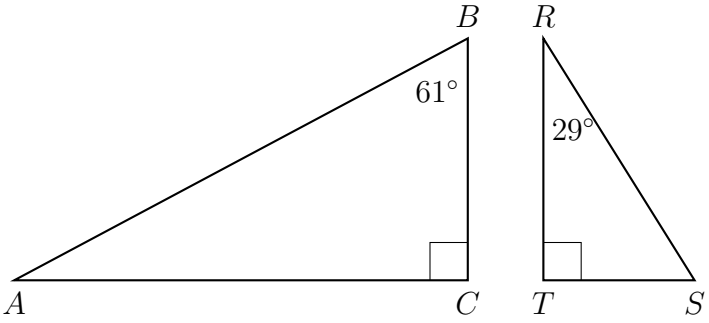
34. The line represented by $2y = x + 8$ is dilated by a scale factor of $k$ centered at the origin, such that the image of the line has an equation of $y - \frac{1}{2}x = 2$. What is the scale factor?

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




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

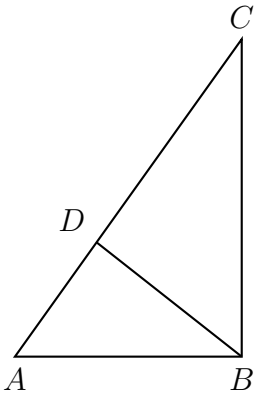
(a) $\frac{AB}{RS} = \frac{RT}{AC}$

(b) $\frac{BC}{ST} = \frac{AB}{RS}$

(c) $\frac{BC}{ST} = \frac{AC}{RT}$

(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?

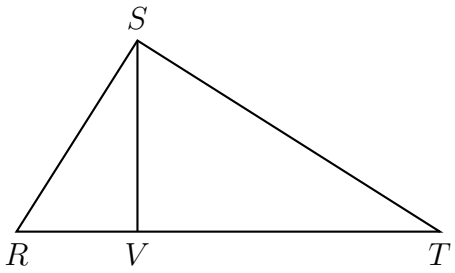
(a) $\frac{AD}{AB} = \frac{BC}{AC}$

(b) $\frac{AD}{AB} = \frac{AB}{AC}$

(c) $\frac{BD}{BC} = \frac{AB}{AD}$

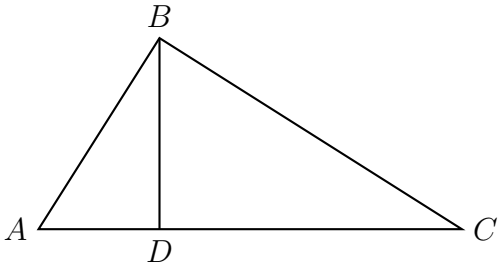
(d) $\frac{AB}{BC} = \frac{BD}{AC}$

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



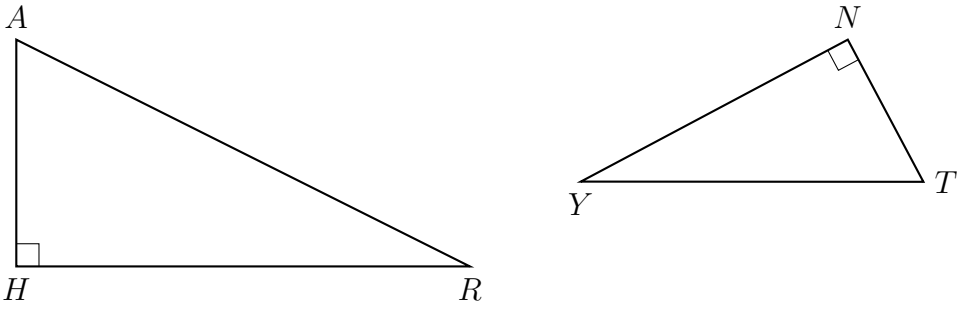

If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?

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



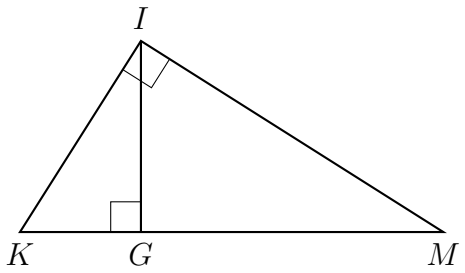

If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?

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



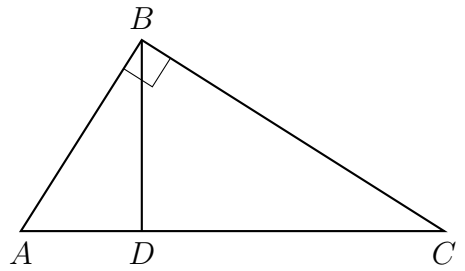

If $AR = 13$ and $HR = 12$, what is the measure of $\angle Y$, to the *nearest degree*?

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 $\cos A$?

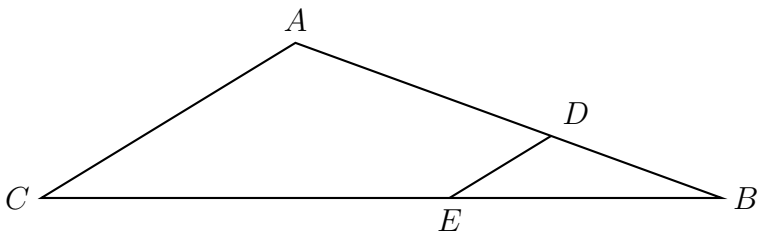
(a) $\frac{AB}{BC}$

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

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

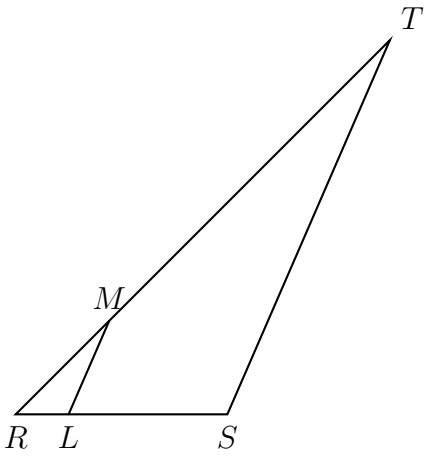
(d) $\frac{BC}{AC}$

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 $\overline{AD}$?

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 $\overline{ST}$?

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