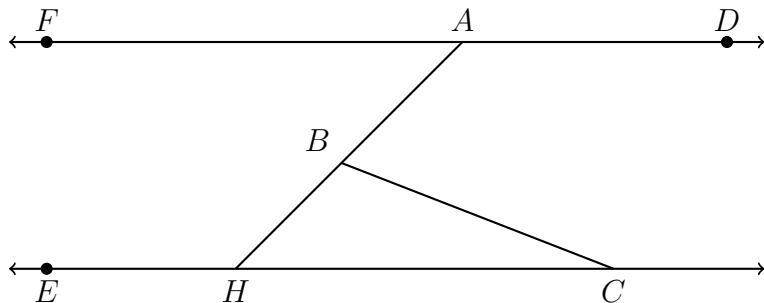


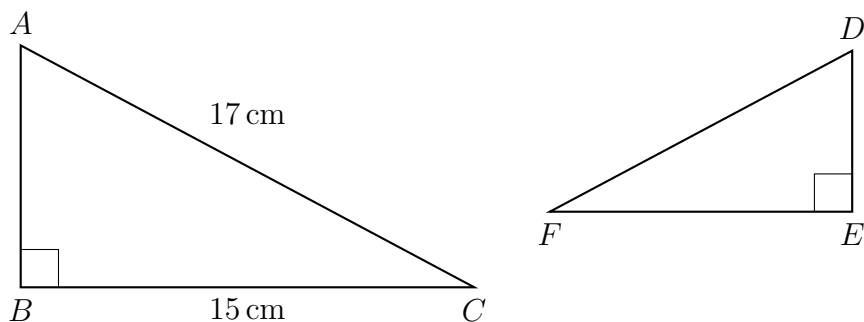
1. In the diagram below,  $\overline{FAD} \parallel \overline{EHC}$ , and  $\overline{ABH}$  and  $\overline{BC}$  are drawn.



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

- (a)  $18^\circ$  (c)  $66^\circ$   
 (b)  $48^\circ$  (d)  $114^\circ$
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  $\overline{PQ}$  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. 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.

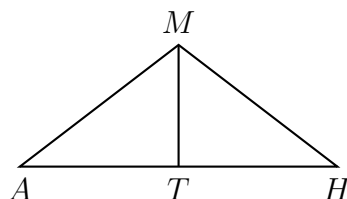


If  $\triangle ABC \sim \triangle DEF$ , with right angles B and E,  $BC = 15$  cm, and  $AC = 17$  cm, what is the measure of  $\angle F$ , to the *nearest degree*?

6. A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?

- (a)  $45^\circ$  (c)  $120^\circ$   
(b)  $90^\circ$  (d)  $135^\circ$

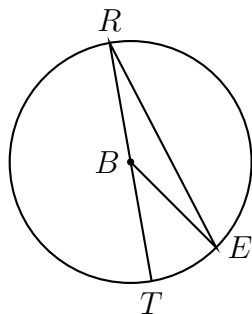
7. In triangle  $MAH$  below,  $\overline{MT}$  is the perpendicular bisector of  $\overline{AH}$ .



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.

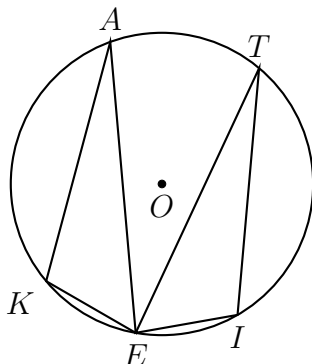


It  $m\angle TRE = 15^\circ$  and  $BE = 9$ , then the area of sector  $EBR$  is what in terms of  $\pi$ ?

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  $1.055 \text{ oz/in}^3$ , 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  $(5, 12)$ .

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?

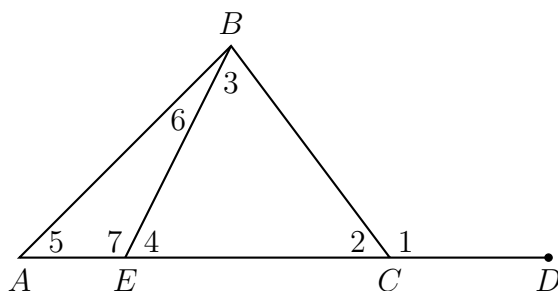
14. In the diagram below of circle  $O$ , points  $K$ ,  $A$ ,  $T$ ,  $I$ , and  $E$  are on the circle,  $\triangle KAE$  and  $\triangle ITE$  are drawn,  $\widehat{KE} \cong \widehat{EI}$ , and  $\angle EKA \cong \angle EIT$ .



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  $11.87^\circ$ . 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<sup>2</sup>. 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  $ABC$ ,  $m\angle C = 90^\circ$  and  $AC \neq BC$ . Which trigonometric ratio is equivalent to  $\sin B$ ?

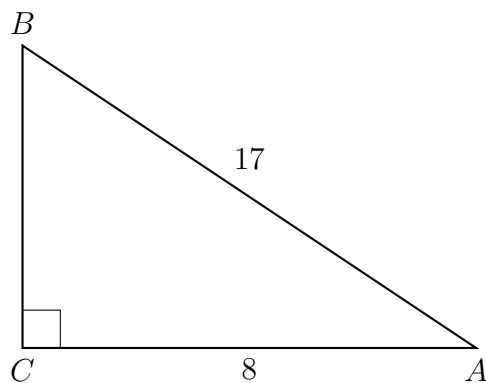
(a)  $\cos A$

(c)  $\tan A$

(b)  $\cos B$

(d)  $\tan B$

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



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

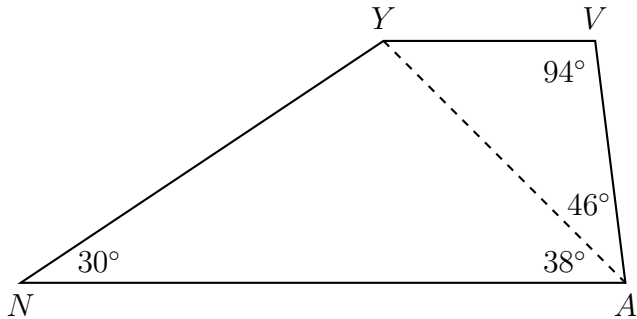
(a)  $\sin A = \frac{8}{17}$

(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  $m\angle VAY = 46^\circ$ .

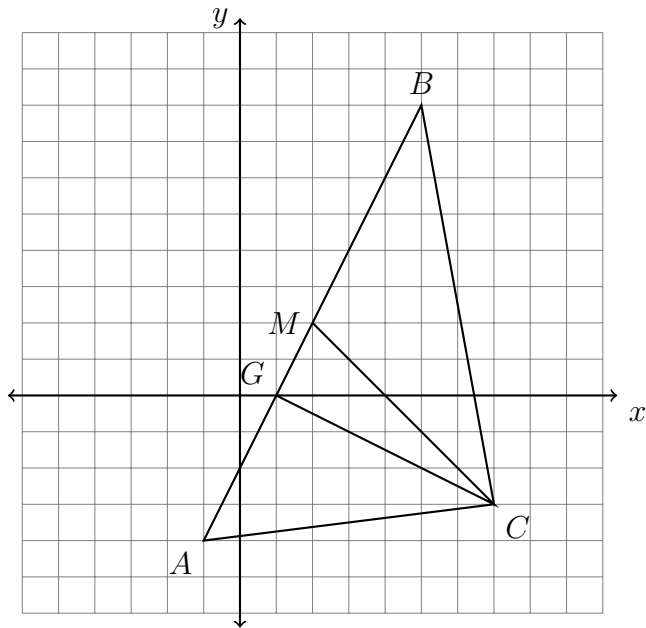


Which segment has the shortest length?

- (a)  $\overline{AY}$

(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)

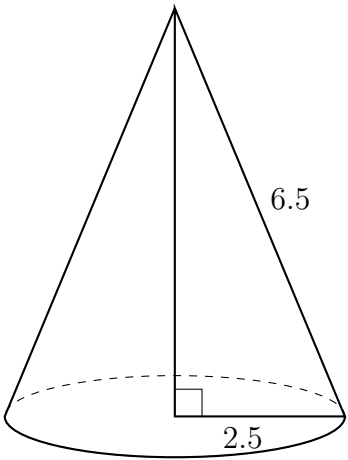
$\frac{(BC)(AC)}{2}$
- (b)

$\frac{(GC)(BC)}{2}$
- (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.

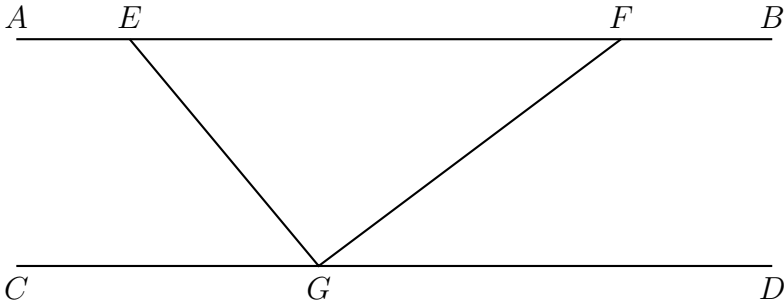


How many cubic centimeters are in the volume of the cone? Express your answer in terms of  $\pi$ .

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

(a)  $11^\circ$

(c)  $75^\circ$

(b)  $43^\circ$

(d)  $105^\circ$

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)  $3x + 2y = 12$

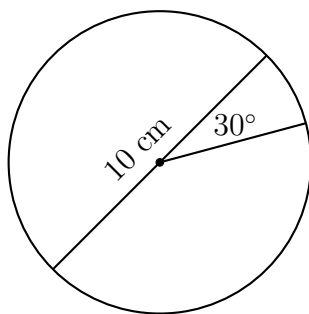
(c)  $y = \frac{3}{2}x + 2$

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

(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  $30^\circ$  is drawn below.



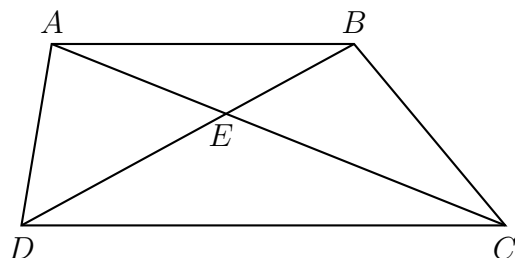
What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the  $30^\circ$  angle?

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

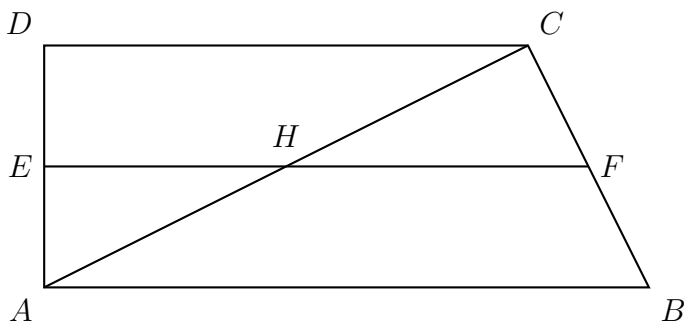
33. In trapezoid  $ABCD$  below,  $\overline{AB} \parallel \overline{CD}$ .



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

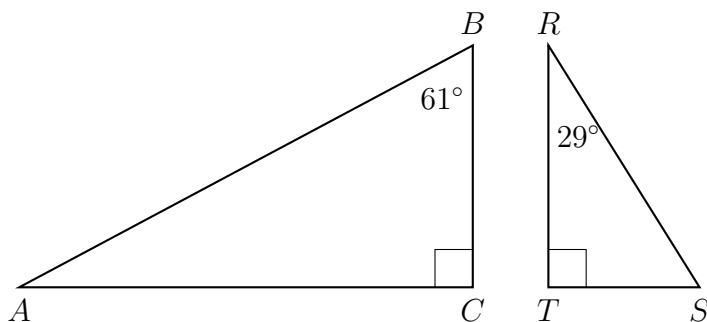
34. The line represented by  $2y = x + 8$  is dilated by a scale factor of  $k$  centered at the origin, such that the image of the line has an equation of  $y - \frac{1}{2}x = 2$ . What is the scale factor?

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.



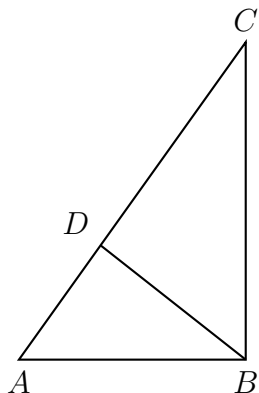
If  $AB = 24$ ,  $CD = 18$ , and  $AH = 10$ , then what is  $FH$ ?

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?

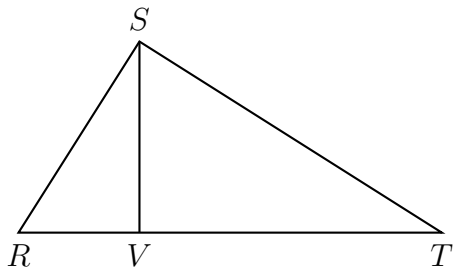
- (a)  $\frac{AB}{RS} = \frac{RT}{AC}$                       (c)  $\frac{BC}{ST} = \frac{AC}{RT}$   
 (b)  $\frac{BC}{ST} = \frac{AB}{RS}$                       (d)  $\frac{AB}{AC} = \frac{RS}{RT}$
37. In the accompanying diagram of right triangle  $ABC$ , altitude  $\overline{BD}$  is drawn to hypotenuse  $\overline{AC}$ .



Which statement must be true?

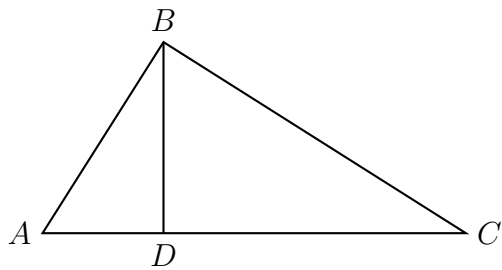
- (a)  $\frac{AD}{AB} = \frac{BC}{AC}$                       (c)  $\frac{BD}{BC} = \frac{AB}{AD}$   
 (b)  $\frac{AD}{AB} = \frac{AB}{AC}$                       (d)  $\frac{AB}{BC} = \frac{BD}{AC}$

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



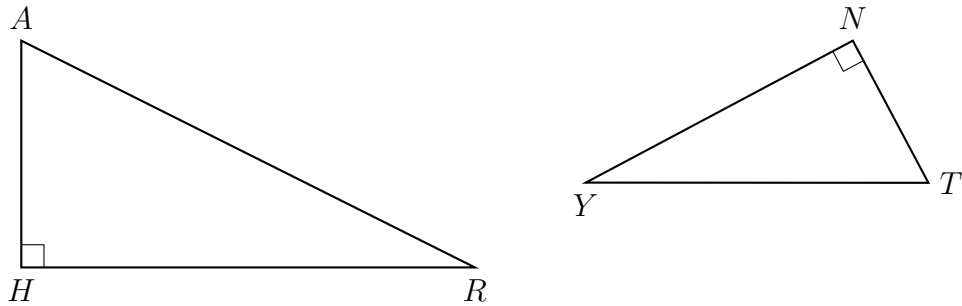
If  $RV = 4.1$  and  $TV = 10.2$ , what is the length of  $\overline{ST}$ , to the *nearest tenth*?

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



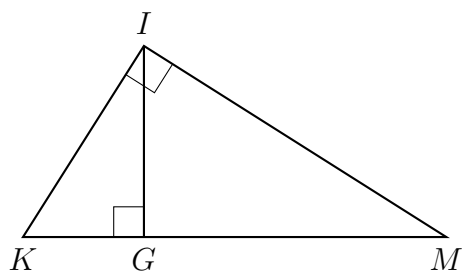
If  $BD = 4$ ,  $AD = x - 6$ , and  $CD = x$ , what is the length of  $\overline{CD}$ ?

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

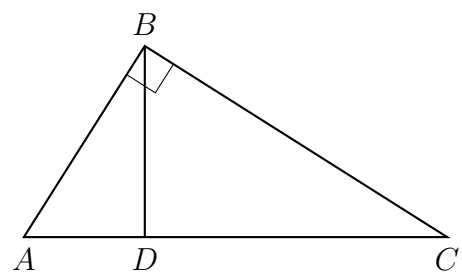


If  $AR = 13$  and  $HR = 12$ , what is the measure of  $\angle Y$ , to the *nearest degree*?

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



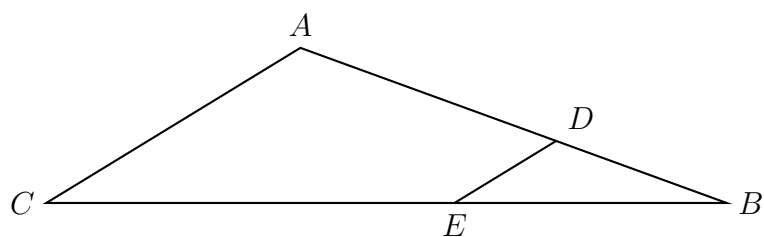
- IF  $KG = 9$  and  $IG = 12$ , what is the length of  $\overline{IM}$ ?
42. In diagram below of right triangle  $ABC$ , altitude  $\overline{BD}$  is drawn.



- Which ratio is always equivalent to  $\cos A$ ?
- (a)  $\frac{AB}{BC}$

(b)  $\frac{BD}{BC}$
- (c)  $\frac{BD}{AB}$

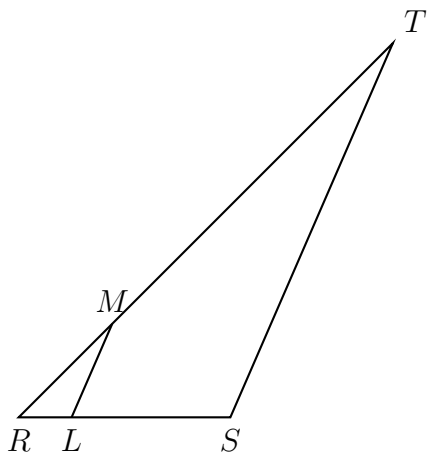
(d)  $\frac{BC}{AC}$
43. In the diagram of  $\triangle ABC$  below, points  $D$  and  $E$  are on sides  $\overline{AB}$  and  $\overline{CB}$  respectively, such that  $\overline{DE} \parallel \overline{AC}$ .



If  $EB$  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  $\overline{ST}$ ?

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