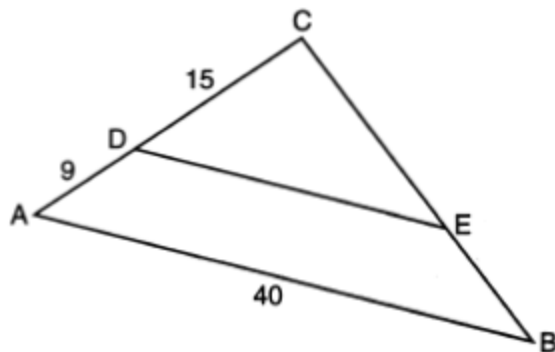


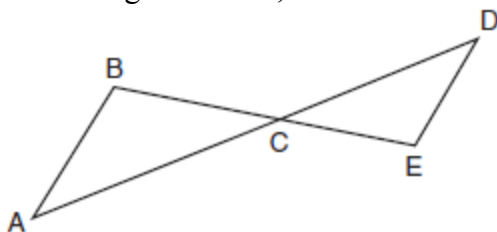
1. In the diagram of  $\triangle ABC$  below,  $\overline{DE}$  is parallel to  $\overline{AB}$ ,  $CD = 15$ ,  $AD = 9$ , and  $AB = 40$ .



The length of  $\overline{DE}$  is

- (1) 25              (2) 30              (3) 15              (4) 24

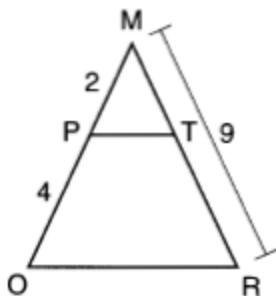
2. In the diagram below,  $\overline{AD}$  intersects  $\overline{BE}$  at  $C$ , and  $\overline{AB} \parallel \overline{DE}$



If  $CD = 6.6$  cm,  $DE = 3.4$  cm,  $CE = 4.2$  cm, and  $BC = 5.25$  cm, what is the length of  $\overline{AC}$ , to the nearest hundredth of a centimeter?

- (1) 5.28              (2) 8.25              (3) 3.34              (4) 2.70

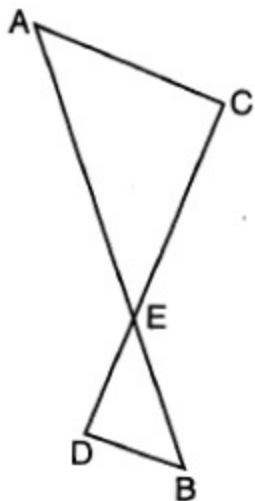
3. Given  $\triangle MRO$  shown below, with trapezoid  $PTRO$ ,  $MR = 9$ ,  $MP = 2$ , and  $PO = 4$ .



What is the length of  $\overline{TR}$ ?

- (1) 5              (2) 4.5              (3) 3              (4) 6

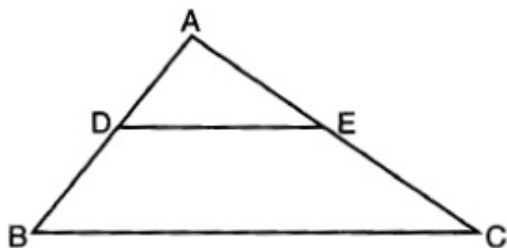
4. As shown in the diagram below,  $\overline{AB}$  and  $\overline{CD}$  intersect at  $E$ , and  $\overline{AC} \parallel \overline{BD}$ .



Given  $\triangle AEC \sim \triangle BED$ , which equation is true?

- (1)  $\frac{EC}{AE} = \frac{BE}{ED}$    (2)  $\frac{CE}{DE} = \frac{EB}{EA}$    (3)  $\frac{ED}{EC} = \frac{AC}{BD}$    **(4)  $\frac{AE}{BE} = \frac{AC}{BD}$**

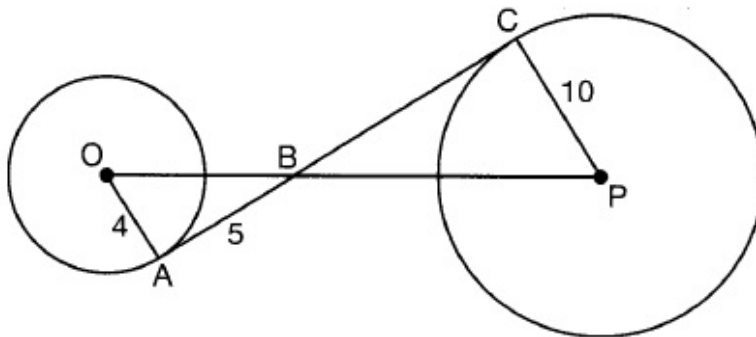
5. In the diagram below,  $\triangle ABC \sim \triangle ADE$



Which measurements are justified by this similarity?

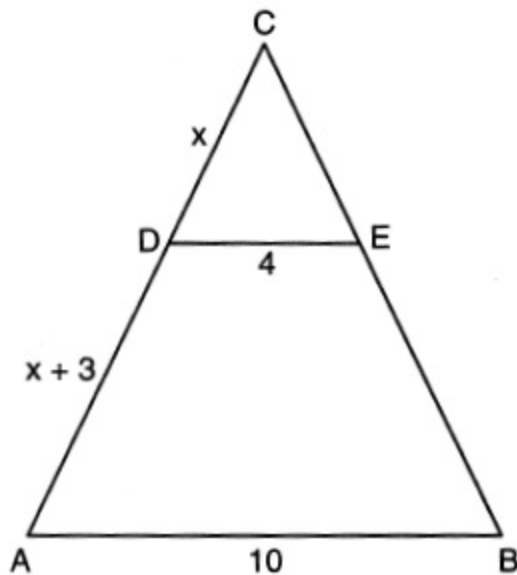
- (1)  $AD = 3$ ,  $AB = 9$ ,  $AE = 5$ , and  $AC = 10$   
**(2)  $AD = 2$ ,  $AB = 6$ ,  $AE = 5$ , and  $AC = 15$**   
 (3)  $AD = 5$ ,  $AB = 8$ ,  $AE = 7$ , and  $AC = 10$   
 (4)  $AD = 3$ ,  $AB = 6$ ,  $AE = 4$ , and  $AC = 12$
6. A 20-foot support post leans against a wall, making a  $70^\circ$  angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
- (1) 18.7      **(2) 18.8**      (3) 6.9      (4) 68

7. In the diagram shown below,  $\overline{AC}$  is tangent to circle  $O$  at  $A$  and to circle  $P$  at  $C$ ,  $\overline{OP}$  intersects  $\overline{AC}$  at  $B$ ,  $OA = 4$ ,  $AB = 5$ , and  $PC = 10$ .



What is the length of  $\overline{BC}$ ?

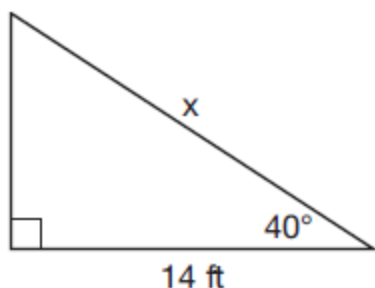
- (1) 6.4      (2) 8      (3) 12.5      (4) 16
8. In the diagram below of  $\triangle ABC$ ,  $\overline{CDA}$ ,  $\overline{CEB}$ ,  $\overline{DE} \parallel \overline{AB}$ ,  $DE = 4$ ,  $AB = 10$ ,  $CD = x$ , and  $DA = x + 3$ .



What is the value of  $x$ ?

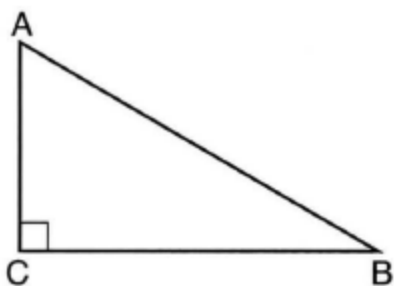
- (1) 2      (2) 5.5      (3) 0.5      (4) 6

9. Given the right triangle in the diagram below, what is the value of  $x$ , to the nearest foot?



- (1) 18                      (2) 22                      (3) 11                      (4) 17

10. In scalene triangle  $ABC$  shown in the diagram below,  $m\angle C = 90^\circ$ .



Which equation is always true?

- (1)  $\cos A = \cos B$                       (2)  $\sin A = \cos B$   
(3)  $\sin A = \sin B$                       (4)  $\cos A = \sin C$

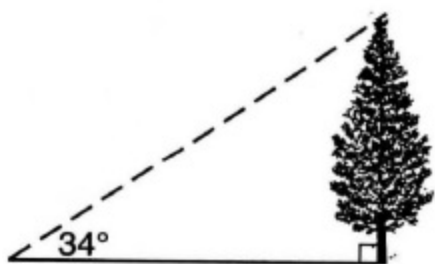
11. Which equation represents a line that is perpendicular to the line represented by  $y = \frac{2}{3}x + 1$ ?

- (1)  $y = \frac{3}{2}x + 2$                       (2)  $y = -\frac{2}{3}x + 4$   
(3)  $3x - 2y = 12$                       (4)  $3x + 2y = 12$

12. What is an equation of the line with y-intercept -15 and is perpendicular to the line whose equation is  $y = \frac{1}{3}x + 6$ ?

- (1)  $y = -3x + 27$                       (2)  $y = \frac{1}{3}x + 15$   
(3)  $y = -3x - 15$                       (4)  $y = \frac{1}{3}x - 13$

13. As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is  $34^\circ$ .



If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?

- (1) 29.7      (2) 16.6      **(3) 13.5**      (4) 11.2

14. Which equation represents a line that is perpendicular to the line whose equation is  $3x - 2y = 7$ ?

- (1)  $y = \frac{3}{2}x - 5$       (2)  $y = \frac{2}{3}x - 4$   
**(3)  $y = -\frac{2}{3}x + 4$**       (4)  $y = -\frac{3}{2}x + 5$

15. What is the slope of a line parallel to the line whose equation is  $2y = -6x + 8$ ?

- (1)  $\frac{1}{3}$**   
(2)  $-3$   
(3)  $\frac{1}{6}$   
(4)  $-6$

16. What is an equation of the line with y-intercept 6 and is parallel to the line whose equation is  $y = \frac{3}{2}x - 4$ ?

- (1)  $y = \frac{-2}{3}x + \frac{5}{3}$       (2)  $y = \frac{3}{2}x$   
**(3)  $y = \frac{3}{2}x + 6$**       (4)  $y = \frac{-2}{3}x$

17. The lines  $3y - 6x = 4$  and  $2y = x - 9$  are

- (1) the same line
- (2) neither parallel nor perpendicular**
- (3) parallel
- (4) perpendicular

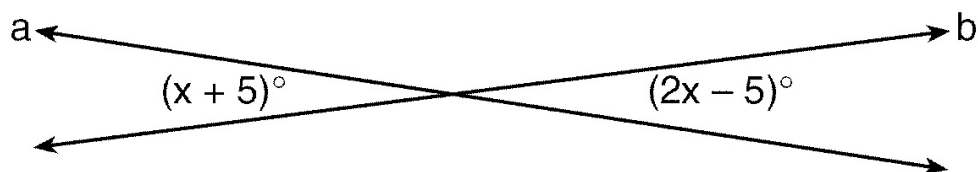
18. The graphs of the lines represented by the equations  $y = \frac{1}{3}x + 7$  and  $y = -\frac{1}{3}x - 2$  are

- (1) horizontal
- (2) parallel
- (3) perpendicular
- (4) intersecting, but not perpendicular**

19. When writing a geometric proof, which angle relationship could be used alone to justify that two angles are congruent?

- (1) vertical angle**
- (2) supplementary angles
- (3) linear pair of angles
- (4) adjacent angles

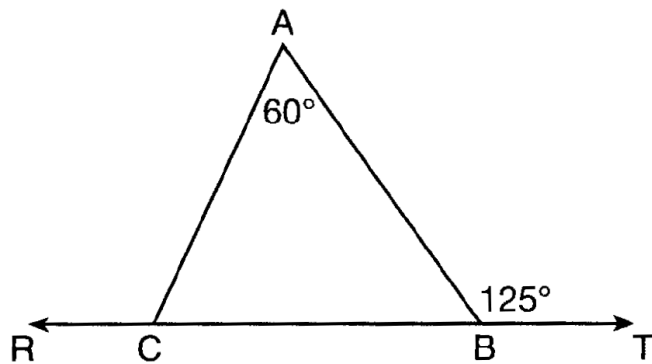
20. In the accompanying diagram, line  $a$  intersects line  $b$ .



What is the value of  $x$ ?

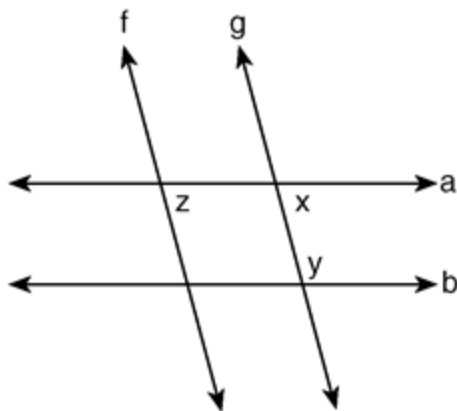
- (1) 90
- (2) -10
- (3) 5
- (4) 10**

21. In the diagram below,  $\overline{RCBT}$  and  $\triangle ABC$  are shown with  $m\angle A = 60$  and  $m\angle ABT = 125$ .



What is  $m\angle ACR$ ?

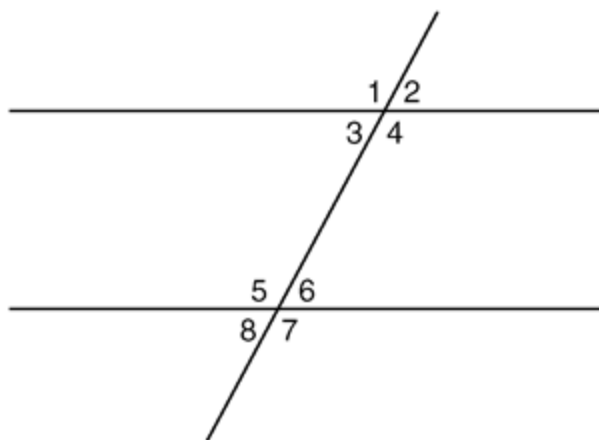
- (1) 125      (2) 115      (3) 65      (4) 55
22. In the accompanying figure,  $a \parallel b$ ,  $f \parallel g$ , and  $m\angle x = 75$ .



What is the value of  $m\angle y + m\angle z$ ?

- (1) 75      (2) 105      (3) 150      (4) 180

23. In the accompanying figure,  $\angle 1 = (60 + x)^\circ$



Which equation shows how to calculate the value of  $\angle 6$ ?

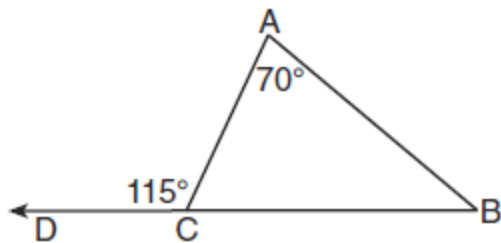
(1)  $(60 + x)^\circ + 180$

(2)  $180 + (60 + x)^\circ$

(3)  $180 - (60 + x)^\circ$

(4)  $(60 + x)^\circ - 180$

24. As shown in the diagram below of  $\triangle ABC$ ,  $\overline{BC}$  is extended through  $D$ ,  $m\angle A = 70$ , and  $m\angle ACD = 115$ .



Which statement is true?

(1)  $AB > BC$    (2)  $BC < AC$    (3)  $AC < AB$    (4)  $AC > AB$



