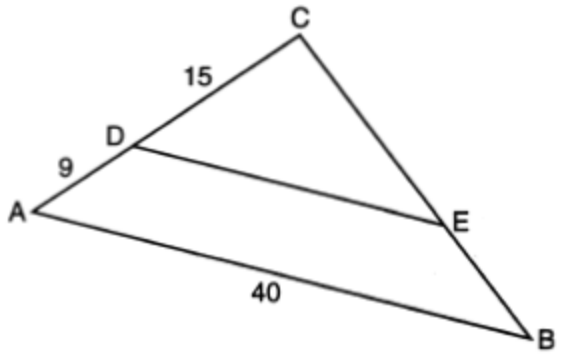
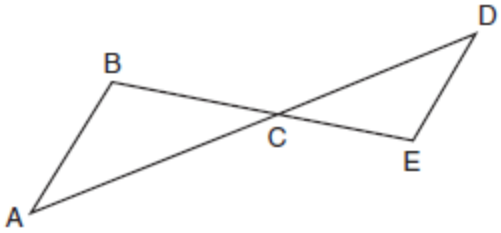
1. In the diagram of $\triangle ABC$ below, $\overline{DE}$ is parallel to $\overline{AB}$, $CD = 15$, $AD = 9$, and $AB = 40$.



The length of $\overline{DE}$ is

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

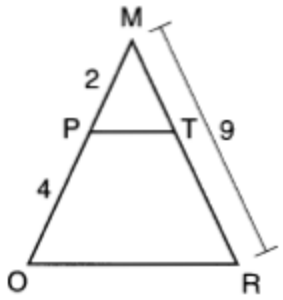
2. In the diagram below, $\overline{AD}$ intersects $\overline{BE}$ at C, and $\overline{AB} \parallel \overline{DE}$



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

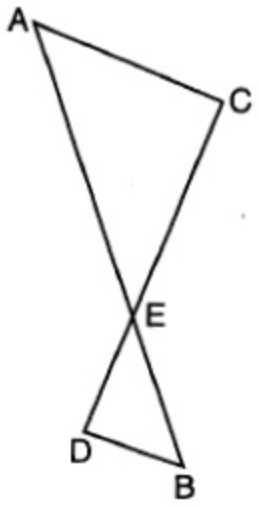
3. Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.



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

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

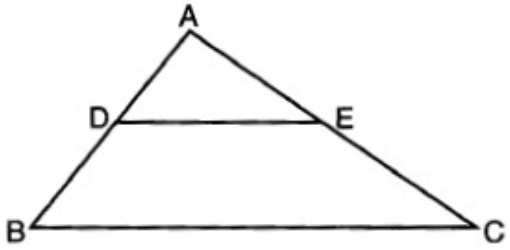
4. As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at *E*, and $\overline{AC} \parallel \overline{BD}$.



Given $\Delta AEC \sim \Delta BED$, 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, $\Delta ABC \sim \Delta ADE$



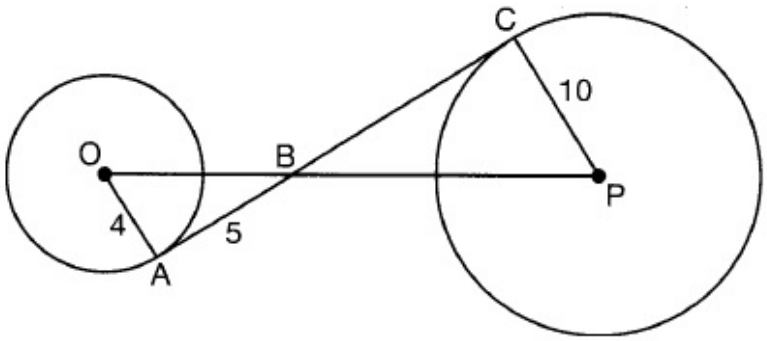
Which measurements are justified by this similarity?

(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° 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

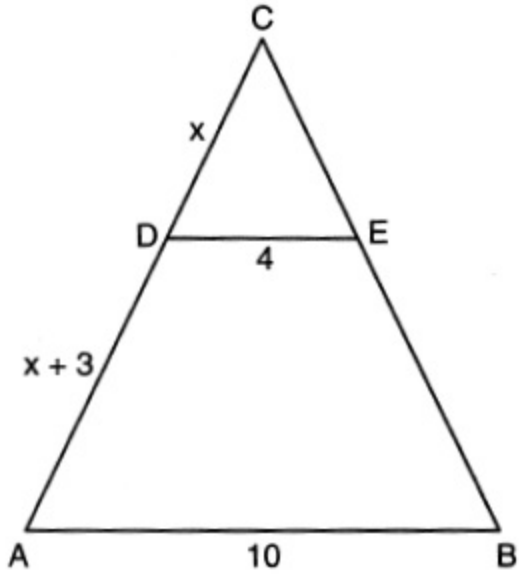
7. In the diagram shown below, $\overline{AC}$ is tangent to circle O at A and to circle Pat C, $\overline{OP}$ intersects $\overline{AC}$ at B, $OA = 4$, $AB = 5$, and $PC = 10$.



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

(1) 6.4 (2) 8 (3) 12.5 (4) 16

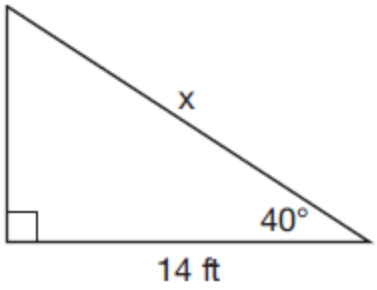
8. In the diagram below of ΔABC, $\overline{CDA}, \overline{CEB}, \overline{DE} \parallel \overline{AB}$, $DE = 4, AB = 10, CD = x,$ and $DA = x + 3$.



What is the value of x?

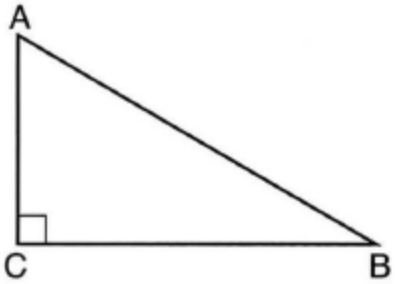
(1) 2 (2) 5.5 (3) 0.5 (4) 6

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, $\mathrm{m}\angle C = 90°$.



Which equation is always true?

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

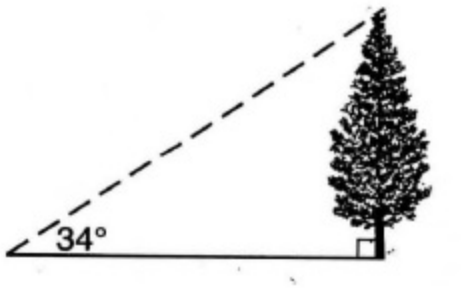
11. Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

(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 $34°$.



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

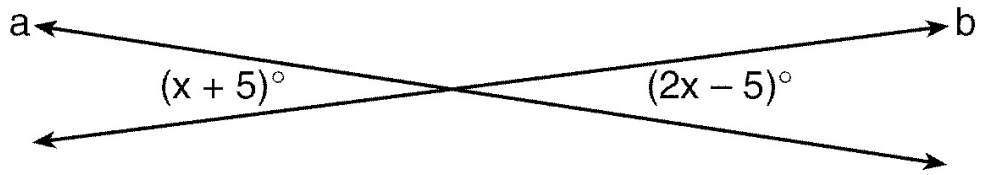
18. The graphs of the lines represented by the equations $y = \frac{1}{3}x + 7$ and $y = -\frac{1}{3}x - 2$ are

(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

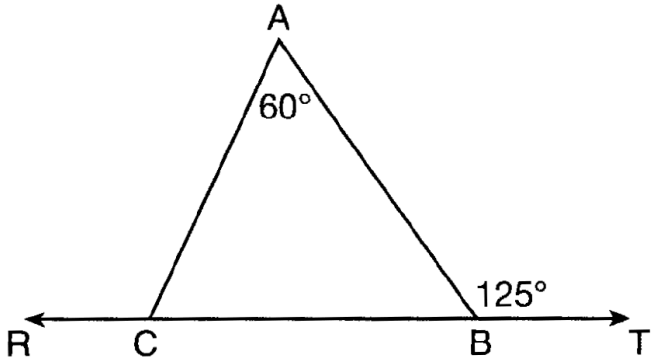
20. In the accompanying diagram, line a intersects line b.



What is the value of x?

(1) 90 (2) –10 (3) 5 (4) 10

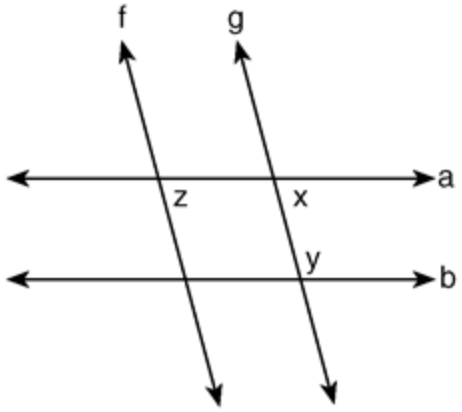
21. In the diagram below, $\overline{RCBT}$ and ΔABC are shown with $m\text{m}\angle A = 60$ and $\text{m}\angle ABT = 125$.



What is m$\angle ACR$?

(1) 125 (2) 115 (3) 65 (4) 55

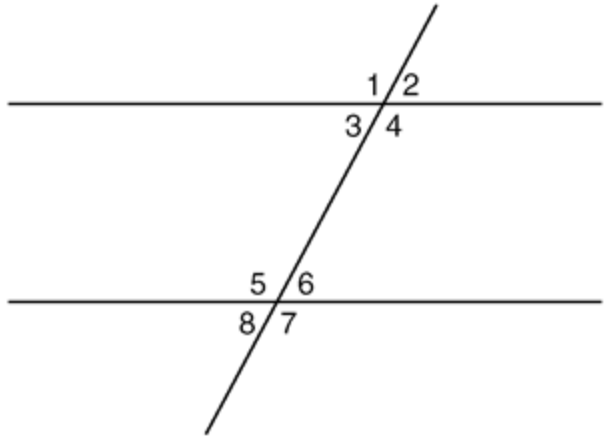
22. In the accompanying figure, $a \parallel b$, $f \parallel g$, *and* $\text{m}\angle x = 75$.



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

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

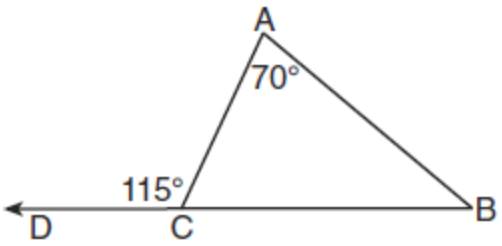
23. In the accompanying figure, $\angle 1 = (60 + x)^\circ$



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 ΔABC, $\overline{BC}$ is extended through D, $\mathrm{m}\angle A = 70$, and $\mathrm{m}\angle ACD = 115$.



Which statement is true?

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