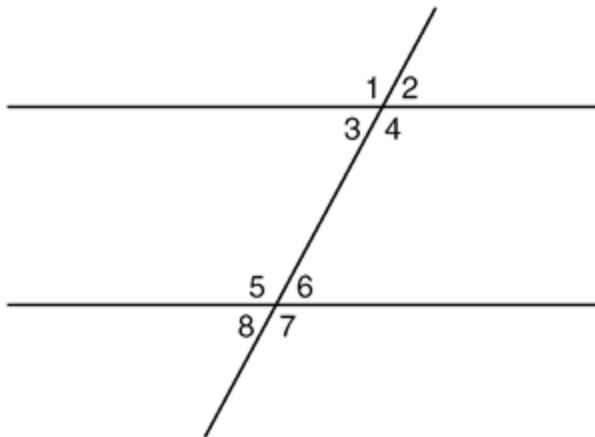1. As shown in the diagram below, $\overline{AB}$ and $\overline{CD}$ intersect at E, and $\overline{AC} \parallel \overline{BD}$.
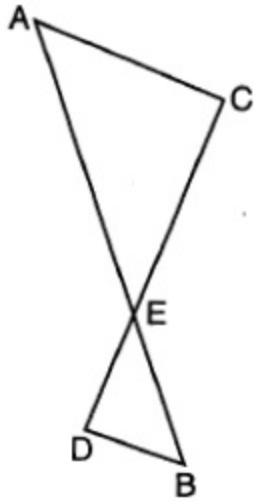
Given $\triangle AEC \sim \triangle BED$, which equation is true?

(1) $\frac{AE}{BE} = \frac{AC}{BD}$ (2) $\frac{CE}{DE} = \frac{EB}{EA}$ (3) $\frac{ED}{EC} = \frac{AC}{BD}$ (4) $\frac{EC}{AE} = \frac{BE}{ED}$
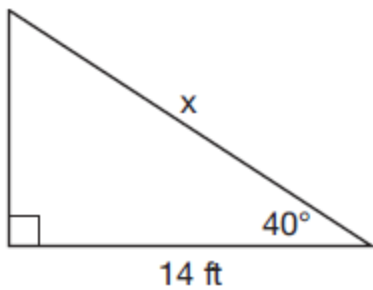
2. In the accompanying figure, $\angle 1 = (60 + x)°$

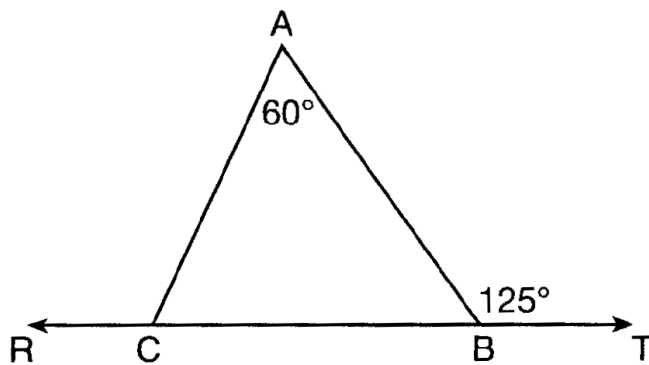Which equation shows how to calculate the value of $\angle 6$?

(1) $180 + (60 + x)°$ (2) $(60 + x)° - 180$

(3) $180 - (60 + x)°$ (4) $(60 + x)° + 180$

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

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

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

What is $\mathrm{m}\angle ACR$?

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

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

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

   (1) parallel

   (2) intersecting, but not perpendicular

   (3) horizontal

   (4) perpendicular

8. 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 $PC = 10$.
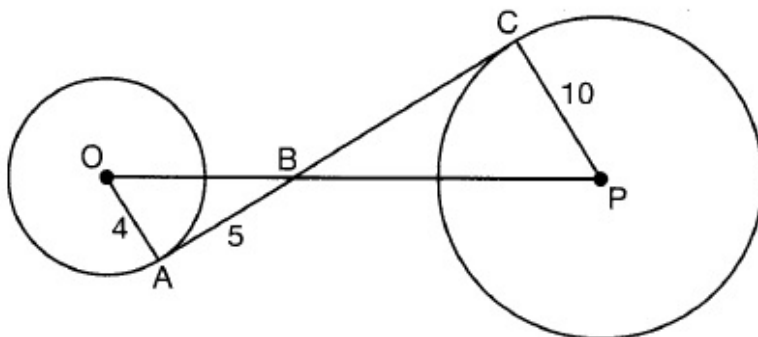
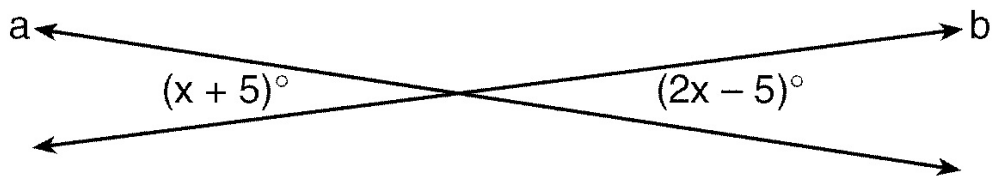What is the length of $\overline{BC}$?

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

9. Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.
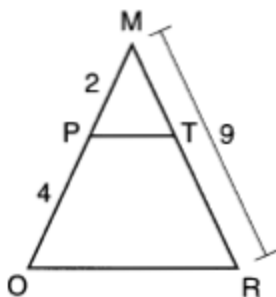
What is the length of $\overline{TR}$?

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

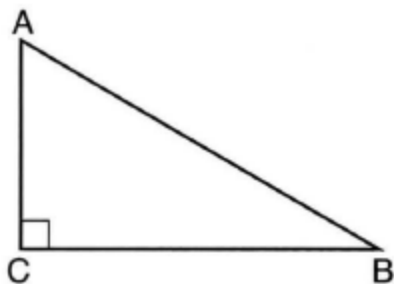10 In the accompanying diagram, line *a* intersects line *b*.

a ← $(x + 5)°$ — $(2x - 5)°$ → b

What is the value of *x*?

(1) 5   **(2) 10**   (3) −10   (4) 90

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) $3x - 2y = 12$

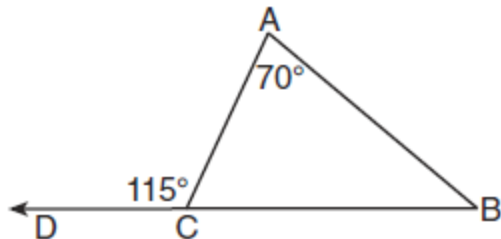(3) $y = -\frac{2}{3}x + 4$ **(4)** $3x + 2y = 12$

12. In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.

Which equation is always true?

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

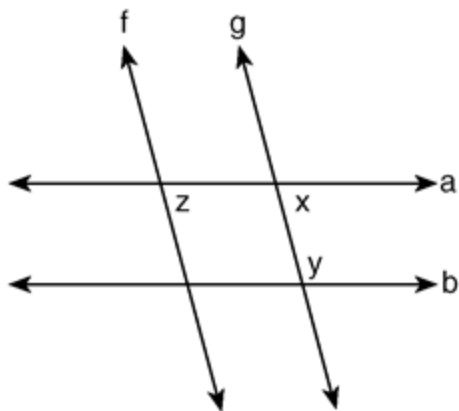**(3)** $\sin A = \cos B$ (4) $\sin A = \sin B$

13. 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) *AC < AB*   (2) *AB > BC*   (3) *AC > AB*   (4) *BC < AC*

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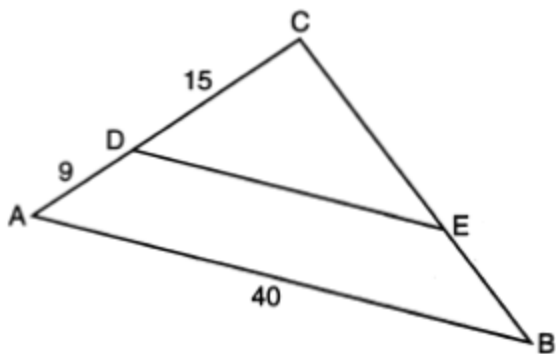

What is the value of $m\angle y + m\angle z$?

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

15. What is the slope of a line parallel to the line whose equation is $2y = -6x + 8$?
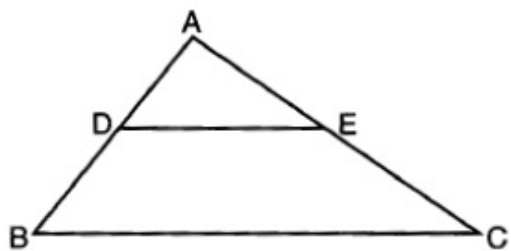
(1) $\dfrac{1}{3}$

(2) $\dfrac{1}{6}$

(3) -6

(4) -3

16. 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) 24   (3) 15   (4) 30

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

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

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

Which measurements are justified by this similarity?

(1) $AD = 2$, $AB = 6$, $AE = 5$, and $AC = 15$
(2) $AD = 3$, $AB = 9$, $AE = 5$, and $AC = 10$
(3) $AD = 3$, $AB = 6$, $AE = 4$, and $AC = 12$
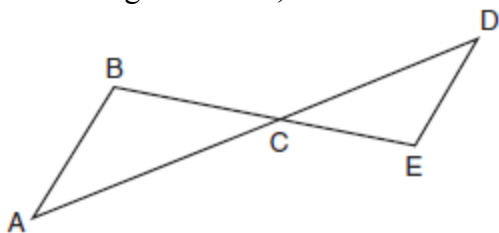(4) $AD = 5$, $AB = 8$, $AE = 7$, and $AC = 10$

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

20. 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) $y = -3x - 15$ (2) $y = \frac{1}{3}x - 13$

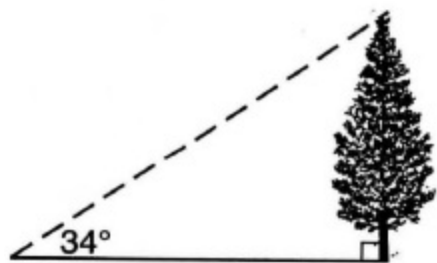(3) $y = \frac{1}{3}x + 15$ (4) $y = -3x + 27$

21. 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?

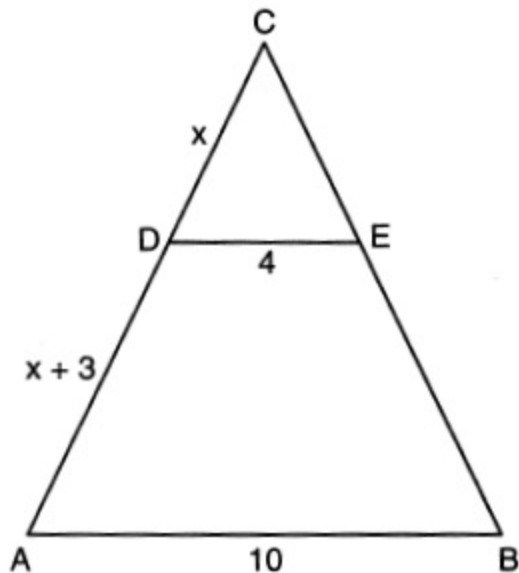**(1) 8.25**   (2) 5.28   (3) 3.34   (4) 2.70

22. 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

23. 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) 6   (2) 2   (3) 0.5   (4) 5.5

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

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