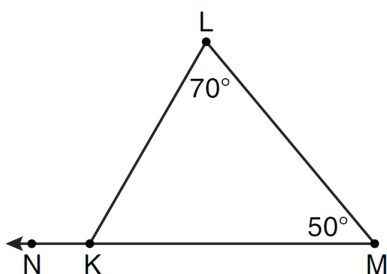


Exterior Angles

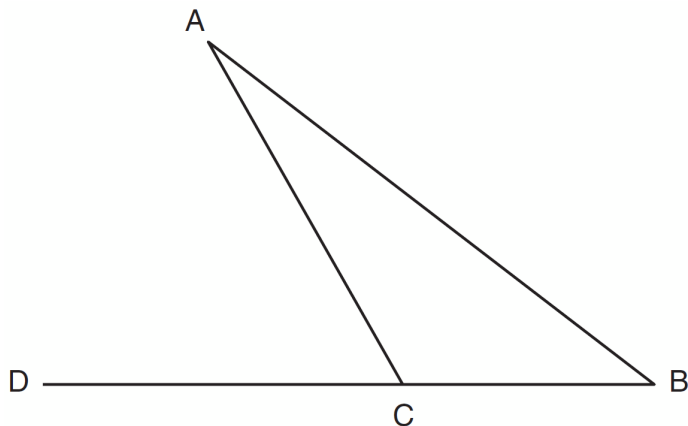
There are two supplementary angles at each vertex: the interior angle and the exterior angle.

1. In the diagram of $\triangle KLM$ below, $m\angle L = 70$, $m\angle M = 50$ and \overline{MK} is extended through N .



What is the measure of $\angle LKN$?

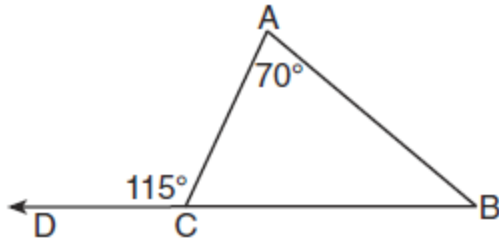
- (1) 60° (2) 120° (3) 180° (4) 300°
2. In $\triangle FGH$, $m\angle F = 42$ and an exterior angle at vertex H has a measure of 104.
What is $m\angle G$?
- (1) 34 (2) 62 (3) 76 (4) 146
3. In the diagram below of $\triangle ABC$, side \overline{BC} is extended to point D , $m\angle A = x$, $m\angle B = 2x + 15$, and $\angle ACD = 5x + 5$.



What is $m\angle B$?

- (1) 5 (2) 20 (3) 25 (4) 55

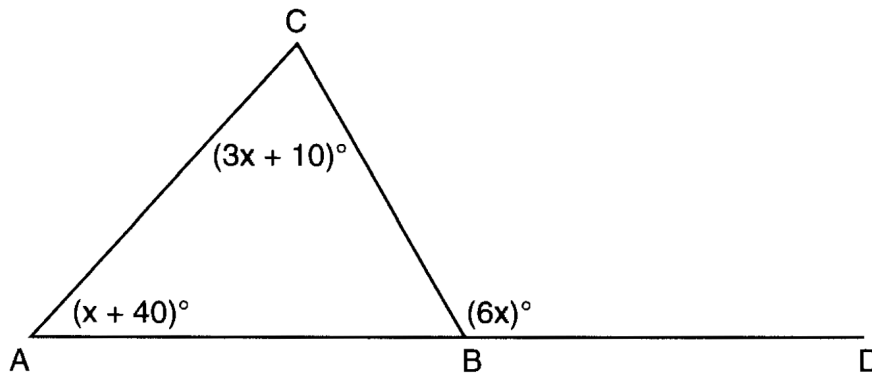
4. As shown in the diagram below of $\triangle ABC$, \overline{BC} is extended through D , $m\angle A = 70$, and $m\angle ACD = 115$.



Which statement is true?

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

5. In the diagram of $\triangle ABC$ below, \overline{AB} is extended to point D .



If $m\angle CAB = x + 40$, $m\angle ACB = 3x + 10$, and $m\angle CBD = 6x$, what is $m\angle CAB$?

- (1) 13 (2) 25 (3) 53 (4) 65

Congruent Triangles

6. Which statement is *not* always true when $\triangle ABC \cong \triangle XYZ$?

- | | |
|---|---|
| (1) $\overline{BC} \cong \overline{YZ}$ | (2) $\overline{CA} \cong \overline{XY}$ |
| (3) $\angle CAB \cong \angle ZXY$ | (4) $\angle BCA \cong \angle YZX$ |

7. Which of the following does not justify that two triangles are congruent?

- (1) SAS (2) SSA (3) ASA (4) HL

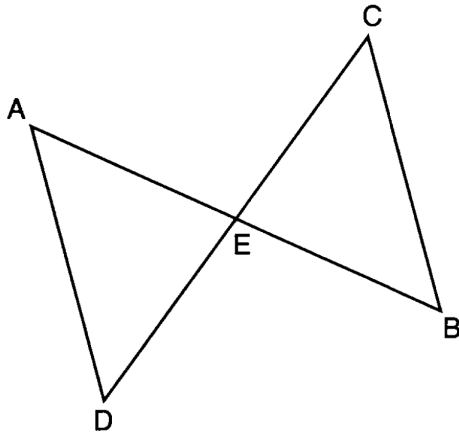
8. If $\triangle ABC \cong \triangle JKL \cong \triangle RST$, then \overline{BC} must be congruent to

- (1) \overline{JL} (2) \overline{JK} (3) \overline{ST} (4) \overline{RS}

9. Two right triangles must be congruent if

- (1) an acute angle in each triangle is congruent
- (2) the lengths of the hypotenuses are equal
- (3) the corresponding legs are congruent
- (4) the areas are equal

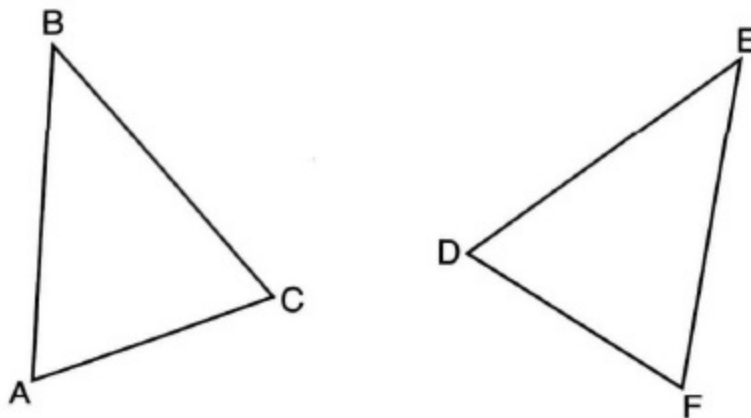
10. In the diagram below of $\triangle DAE$ and $\triangle BCE$, \overline{AB} and \overline{CD} intersect at E , such that $\overline{AE} \cong \overline{CE}$ and $\angle BCE \cong \angle DAE$.



Triangle DAE can be proved congruent to triangle BCE by

- (1) ASA (2) SAS (3) SSS (4) HL

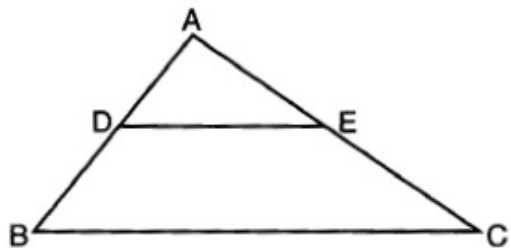
11. Which statement is sufficient evidence that $\triangle DEF$ is congruent to $\triangle ABC$?



- (1) $AB = DE$ and $BC = EF$
 (2) $\angle D \cong \angle A$, $\angle B \cong \angle E$, $\angle C \cong \angle F$
 (3) There is a sequence of rigid motions that maps \overline{AB} onto \overline{DE} , \overline{BC} onto \overline{EF} , and \overline{AC} onto \overline{DF} .
 (4) There is a sequence of rigid motions that maps point A onto point D , \overline{AB} onto \overline{DE} , and $\angle B$ onto $\angle E$.

Similar Triangles

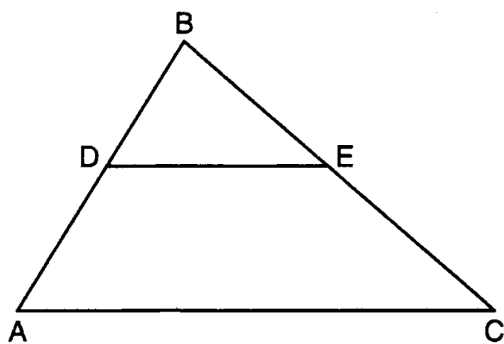
12. In the diagram below, $\triangle ABC \sim \triangle ADE$



Which measurements are justified by this similarity?

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

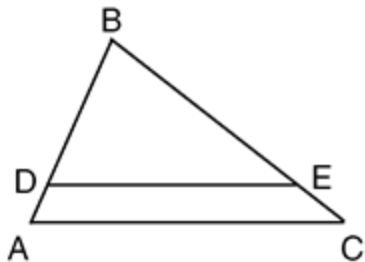
13. In the diagram below of $\triangle ABC$, \overline{DE} is a midsegment of $\triangle ABC$, $DE = 7$, $AB = 10$, and $BC = 13$. Find the perimeter of $\triangle ABC$.



14. If $\triangle RST \sim \triangle ABC$, $m\angle A = 7 + 8x$, $m\angle C = 4x + 8$, and $m\angle R = 3x - 60$, find $m\angle C$

- (1) 55
- (2) 50
- (3) 60
- (4) 65

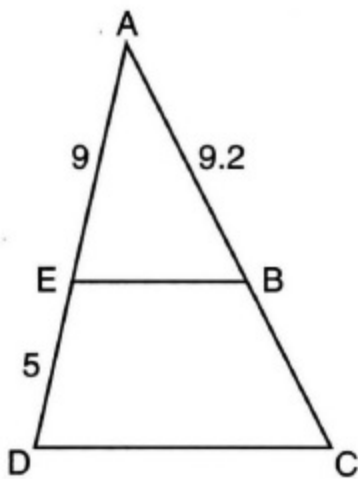
15. In the accompanying diagram, $\overline{AC} \parallel \overline{DE}$, $AB = 10$, $BC = 15$, and $BD = 8$.



What is the length of \overline{EC} ?

- (1) $5\frac{1}{3}$ (2) 2 (3) 3 (4) 12

16. In the diagram of $\triangle ADC$ below, $\overline{EB} \parallel \overline{DC}$, $AE = 9$, $ED = 5$, and $AB = 9.2$.



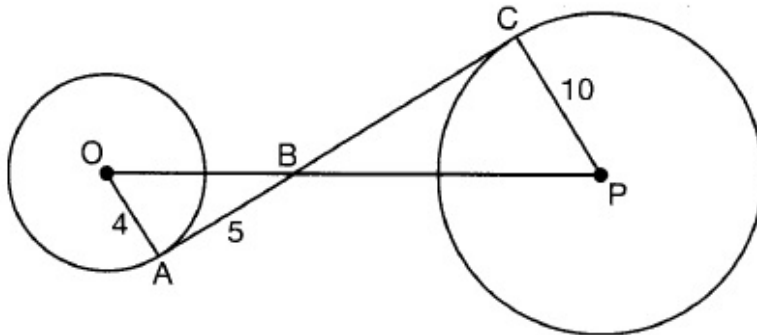
What is the length of \overline{AC} , to the *nearest tenth*?

- (1) 5.1 (2) 5.2 (3) 14.3 (4) 14.4

17. When $\triangle ABC$ is dilated by a scale factor of 2, its image is $\triangle A'B'C'$. Which statement is true?

- (1) $\overline{AC} \cong \overline{A'C'}$
(2) $\angle A \cong \angle A'$
(3) perimeter of $\triangle ABC$ = perimeter of $\triangle A'B'C'$
(4) $2(\text{area of } \triangle ABC) = \text{area of } \triangle A'B'C'$

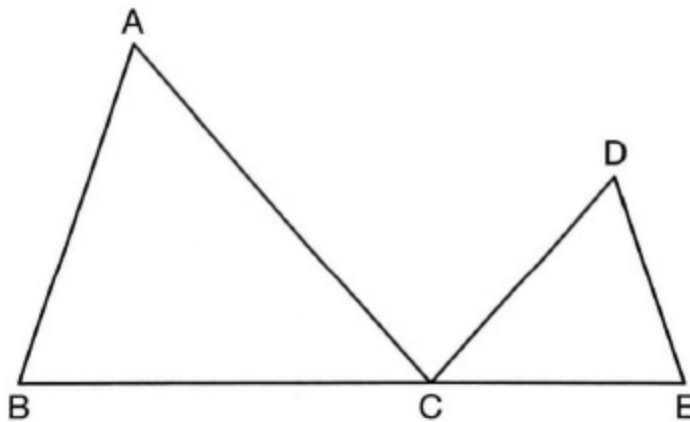
18. In the diagram shown below, \overline{AC} is tangent to circle O at A and to circle P at C , \overline{OP} intersects \overline{AC} at B , $OA = 4$, $AB = 5$, and $PC = 10$.



What is the length of \overline{BC} ?

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

19. In the diagram below, $\triangle ABC \sim \triangle DEC$.



If $AC = 12$, $DC = 7$, $DE = 5$, and the perimeter of $\triangle ABC$ is 30, what is the perimeter of $\triangle DEC$?

- (1) 12.5 (2) 14.0 (3) 14.8 (4) 17.5