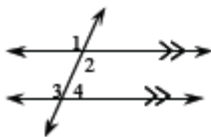


PROPERTIES OF ANGLES, LINES, AND TRIANGLES

Students learn the relationships created when two parallel lines are intersected by a transversal. They also study angle relationships in triangles.

Parallel lines

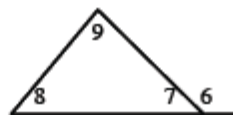


- corresponding angles are equal: $m\angle 1 = m\angle 3$
- alternate interior angles are equal: $m\angle 2 = m\angle 3$
- $m\angle 2 + m\angle 4 = 180^\circ$

Also shown in the above figures:

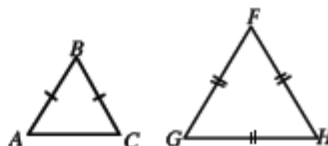
- vertical angles are equal: $m\angle 1 = m\angle 2$
- linear pairs are supplementary: $m\angle 3 + m\angle 4 = 180^\circ$ and $m\angle 6 + m\angle 7 = 180^\circ$

Triangles



- $m\angle 7 + m\angle 8 + m\angle 9 = 180^\circ$
- $m\angle 6 = m\angle 8 + m\angle 9$
(exterior angle = sum remote interior angles)

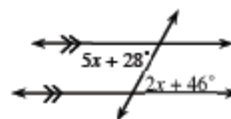
In addition, an isosceles triangle, $\triangle ABC$, has $\overline{BA} = \overline{BC}$ and $m\angle A = m\angle C$. An equilateral triangle, $\triangle GFH$, has $\overline{GF} = \overline{FH} = \overline{HG}$ and $m\angle G = m\angle F = m\angle H = 60^\circ$.



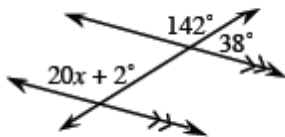
For more information, see the Math Notes boxes in Lessons 9.1.2, 9.1.3, and 9.1.4 of the *Core Connections, Course 3* text.

Example 3

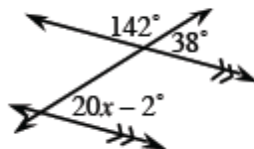
Find the measure of the acute alternate interior angles. Parallel lines mean that alternate interior angles are equal, so $5x + 28^\circ = 2x + 46^\circ \Rightarrow 3x = 18^\circ \Rightarrow x = 6^\circ$. Use either algebraic angle measure: $2(6^\circ) + 46^\circ = 58^\circ$ for the measure of the acute angle.



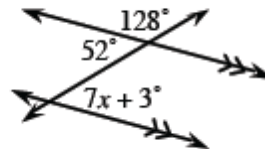
13.



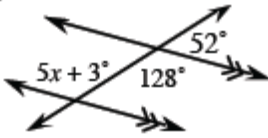
14.



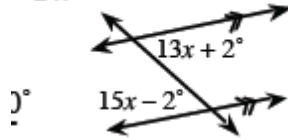
15.



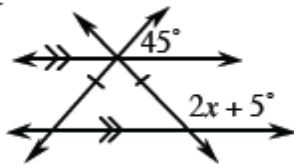
16.



24.



26.



Answers

- | | | | | | |
|----------------|-----------------|--------------------------|------------------|-----------------|---------------------------|
| 1. 45° | 2. 35° | 3. 40° | 4. 34° | 5. 12.5° | 6. 15° |
| 7. 15° | 8. 25° | 9. 20° | 10. 5° | 11. 3° | 12. $10\frac{2}{3}^\circ$ |
| 13. 7° | 14. 2° | 15. 7° | 16. 25° | 17. 81° | 18. 7.5° |
| 19. 9° | 20. 7.5° | 21. 7° | 22. 15.6° | 23. 26° | 24. 2° |
| 25. 40° | 26. 65° | 27. $7\frac{1}{6}^\circ$ | 28. 10° | | |