Algebraic Exercises

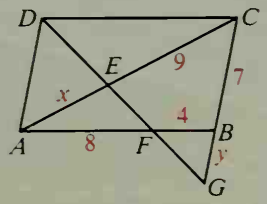
In Exercises 1–9 find the value of x.

A

1. On a number line, R and S have coordinates -8 and x, and the midpoint of $\overline{RS}$ has coordinate -1.
2. Two vertical angles have measures $x^2 + 18x$ and $x^2 + 54$.
3. The measures of the angles of a quadrilateral are x, $x + 4$, $x + 8$, and $x + 12$.
4. The lengths of the legs of an isosceles triangle are $7x - 13$ and $2x + 17$.
5. Consecutive angles of a parallelogram have measures $6x$ and $2x + 20$.
6. A trapezoid has bases of length x and $x + 8$ and a median of length 15.
7. $\dfrac{3x - 1}{4x + 2} = \dfrac{2}{3}$
8. $\dfrac{5}{8} = \dfrac{x - 1}{6}$
9. $\dfrac{x}{x + 4} = \dfrac{x + 3}{x + 9}$

B

10. The measure of a supplement of an angle is 8 more than three times the measure of a complement. Find the measure of the angle.
11. In a regular polygon, the ratio of the measure of an exterior angle to the measure of an interior angle is 2:13. How many sides does the polygon have?
12. The sides of a parallelogram have lengths 12 cm and 15 cm. Find the lengths of the sides of a similar parallelogram with perimeter 90 cm.
13. A triangle with perimeter 64 cm has sides with lengths in the ratio 4:5:7. Find the length of each side.
14. In $\triangle XYZ$, $XY = YZ$. Find the measure of $\angle Z$ if $m\angle X : m\angle Y = 5:2$.
15. In the diagram, $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \parallel \overline{GC}$. Find the values of x and y.



Proof Exercises

A

1. Given: $\overline{SU} \cong \overline{SV}$; $\angle 1 \cong \angle 2$
   Prove: $\overline{UQ} \cong \overline{VQ}$
2. Given: $\overrightarrow{QS}$ bisects $\angle RQT$; $\angle R \cong \angle T$
   Prove: $\overrightarrow{SQ}$ bisects $\angle RST$.

B

3. Given: $\triangle QRU \cong \triangle QTV$; $\overline{US} \cong \overline{VS}$
   Prove: $\triangle QRS \cong \triangle QTS$
4. Given: $\overline{QS}$ bisects $\angle UQV$ and $\angle USV$; $\angle R \cong \angle T$
   Prove: $\overline{RQ} \cong \overline{TQ}$
5. Given: $\overline{EF} \parallel \overline{JK}$; $\overline{JK} \parallel \overline{HI}$
   Prove: $\triangle EFG \sim \triangle IHG$
6. Given: $\dfrac{JG}{HG} = \dfrac{KG}{IG}$, $\angle 1 \cong \angle 2$
   Prove: $\overline{EF} \parallel \overline{HI}$