

Geometry 2.6

Use algebra to write 2-column proofs

Use properties of equality to write geometric proofs

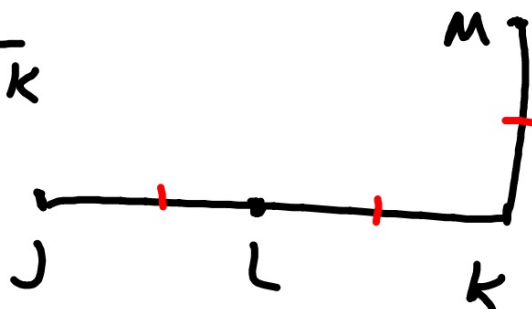
algebraic proof

2-column proof (formal proof)

Given (hypothesis)

Prove (conclusion)

(31) Given: $P \mid T \mid L \text{ is mp } \bar{J}K$
 $\bar{MK} \cong \bar{JL}$
 Prove: $\bar{LK} \cong \bar{MK}$



- | | |
|--|-----------|
| 1. $P \mid T \mid L \text{ is mp}$ | 1. given |
| 2. $\bar{MK} \cong \bar{JL}$ | |
| 2. $\bar{JL} \cong \bar{LK}$ | 2. def mp |
| 3. $\bar{MK} \cong \bar{LK}$ | 3. trans |
| 4. $\bar{LK} \cong \bar{MK}$ | 4. Symm. |

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KeyConcept Properties of Real Numbers

The following properties are true for any real numbers a , b , and c .

Addition Property of Equality	If $a = b$, then $a + c = b + c$.
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$.
Multiplication Property of Equality	If $a = b$, then $a \cdot c = b \cdot c$.
Division Property of Equality	If $a = b$ and $c \neq 0$, then, $\frac{a}{c} = \frac{b}{c}$.
Reflexive Property of Equality	$a = a$
Symmetric Property of Equality	If $a = b$, then $b = a$.
Transitive Property of Equality	If $a = b$ and $b = c$, then $a = c$.
Substitution Property of Equality	If $a = b$, then a may be replaced by b in any equation or expression.
Distributive Property	$a(b + c) = ab + ac$

State the property that justifies each statement.

13. If $5(x + 7) = -3$, then $5x + 35 = -3$. distrib.
14. If $m\angle 1 = 25$ and $m\angle 2 = 25$, then $m\angle 1 = m\angle 2$. subs.
15. If $AB = BC$ and $BC = CD$, then $AB = CD$. trans.
16. If $3\left(x - \frac{2}{3}\right) = 4$, then $3x - 2 = 4$. distrib.

Copy and complete

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17. ARGUMENTS Complete each proof.

17. Given: $\frac{8-3x}{4} = 32$

Prove: $x = -40$

Proof:

Statements	Reasons
a. $\frac{8-3x}{4} = 32$	a. Given
b. $4\left(\frac{8-3x}{4}\right) = 4(32)$	b. <u>mult prop.</u>
c. $8-3x = 128$	c. <u>subs.</u>
d. $-3x = 120$	d. Subtraction Property
e. $x = -40$	e. <u>div. prop</u>

Copy and complete

18. Given: $\frac{1}{5}x + 3 = 2x - 24$ ✓

Prove: $x = 15$ 1

Proof:

Statements	Reasons
5 a. $\frac{1}{5}x + 3 = 2x - 24$	a. Given
b. $5(\frac{1}{5}x + 3) = 5(2x - 24)$	b. Multiplication Property
c. $x + 15 = 10x - 120$	c. <u>Subs</u>
d. $x + 15 - x + 120 = 10x - 120 - x + 120$	d. Subtraction Property / add.
e. $135 = 9x$	e. <u>Subs</u>
f. $\frac{135}{9} = \frac{9x}{9}$	f. Division Property
g. $15 = x$	g. Symmetric Property <u>Subs</u>

$x = 15$

Symm

PROOF Write a two-column proof

19. If $-\frac{1}{3}n = 12$, then $n = -36$.

Given:

Prove:

Drawing (if any)

Given $-\frac{1}{3}n = 12$

Prove $n = -36$

1. $-\frac{1}{3}n = 12$

1. given

2. $-3 \cdot -\frac{1}{3}n = -3 \cdot 12$

2. mult prop

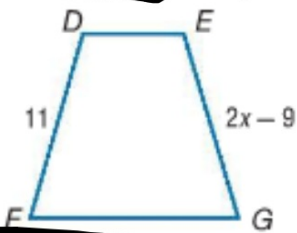
3. $n = -36$

3. subs

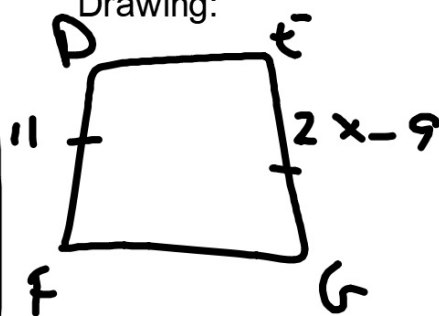
Whiteboards

PROOF Write a two-column proof.

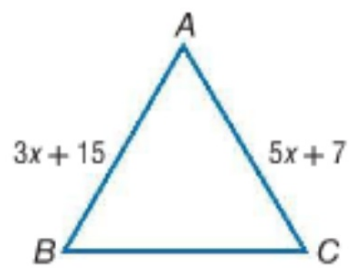
23. If $\overline{DF} \cong \overline{EG}$, then $x = 10$.



Given: $\widehat{DF} \cong \widehat{EG}$
Prove: $x = 10$
Drawing:

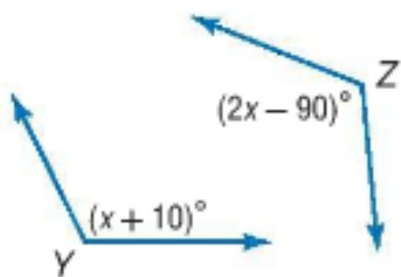


24. If $\overline{AB} \cong \overline{AC}$, then $x = 4$.



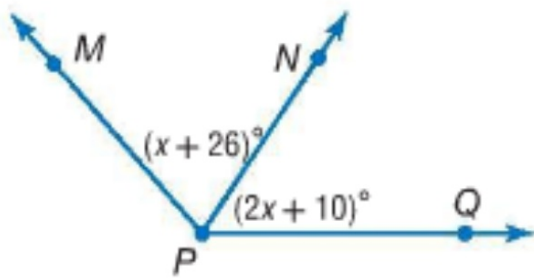
Given
Prove
Drawing

- 25 If $\angle Y \cong \angle Z$, then $x = 100$.



Given
Prove
Drawing

26. If $\angle MPN \cong \angle QPN$, then $x = 16$.



Given
Prove
Drawing