

Answer Key.

Justifying the Steps for Algebra Problems

Now, you will practice writing justifications for proofs using algebra problems. You will need to use one of the properties for equality for real numbers to justify each step taken to solve the given problem.

Justify each step in solving $2x - 5 = 18$.

Given: $2x - 5 = 18$

Prove: $x = 11.5$

Statements	Reasons
1. $2x - 5 = 18$	1. Given
2. $2x = 23$	2. Add prop
3. $x = 11.5$	3. Div prop

Justify each step in solving $2(3x - 1) = 22$.

Given: $2(3x - 1) = 22$

Prove: $x = 4$

Statements	Reasons
1. $2(3x - 1) = 22$	1. Given
2. $6x - 2 = 22$	2. Dist. Prop
3. $6x = 24$	3. Add Prop
4. $x = 4$	4. Div Prop

Solve and Justify the Steps for Each Algebra Problem

Now, you will practice creating proofs by solving algebra problems. You will need to solve each problem, then use one of the properties for equality for real numbers to justify each step taken to solve the given problem.

Solve and justify each step in solving $3(x + 5) + 7 = 25$.

Given: $3(x + 5) + 7 = 25$

Prove: $x = 1$

Statements	Reasons
1. $3(x+5) + 7 = 25$	1. Given
2. $3x + 15 + 7 = 25$	2. Dist. Prop
3. $3x + 22 = 25$	3. sub prop
4. $3x = 3$	4. subtract prop
5. $x = 1$	5. Div. prop

Solve and justify each step in solving $\frac{2x+11}{3} = 27$.

Given: $\frac{2x+11}{3} = 27$

Prove: $x = 35$

Statements	Reasons
1. $\frac{2x+11}{3} = 27$	1. Given
2. $2x + 11 = 81$	2. Mult. prop
3. $2x = 70$	3. subtraction prop
4. $x = 35$	4. Div. Prop

Cut it Out: Simple Proof with Segment Addition

Review the information that you have learned about line segments and use that information to justify each step for the proof. (Review the segment addition postulate and the properties of equality before beginning this proof.)

Justify the steps for the proof of the conditional if $AC = BD$, then $AB = CD$.

Given: $AC = BD$
 Prove: $AB = CD$



Statements

Reasons

1. $AC = BD$
2. $AB + BC = AC$
 $BC + CD = BD$
3. $AB + BC = BC + CD$
4. $AB = CD$

1. Given
2. Segment Addition Postulate
3. substitution Prop
4. subtraction Prop

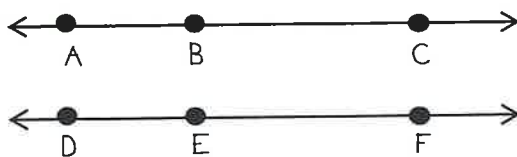
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Cut it Out: Writing a Two-Column Proof (Segment Addition)

Review the information that you have learned about line segments and use that information to create a two-column proof. (Review the segment addition postulate and the properties of equality before beginning this proof.)

Prove that if $AC = DF$ and $AB = DE$, then $BC = EF$.

Given: $AC = DF$ and $AB = DE$
 Prove: $BC = EF$



Statements

Reasons

1. $AC = DF$
2. $AB = DE$
3. $AB + BC = AC$
 $DE + EF = DF$
4. $AB + BC = DE + EF$
5. $BC = EF$

1. Given
2. Given
3. Segment Add Post
4. substitution Prop
5. subtraction Prop

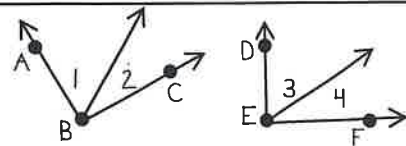
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Cut it Out: Writing a Two-Column Proof (Angle Addition)

Review the information that you have learned about line segments and use that information to create a two-column proof. (Review the angle addition postulate and the properties of equality before beginning this proof.)

Prove that if $m\angle ABC = m\angle DEF$ and $m\angle 1 = m\angle 3$, then $m\angle 2 = m\angle 4$.

Given: $m\angle ABC = m\angle DEF$ and $m\angle 1 = m\angle 3$
 Prove: $m\angle 2 = m\angle 4$



Statements

Reasons

1. $m\angle ABC = m\angle DEF$
 $m\angle 1 = m\angle 3$
2. $m\angle ABC = m\angle 1 + m\angle 2$
 $m\angle DEF = m\angle 3 + m\angle 4$
3. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$
4. $m\angle 1 + m\angle 2 = m\angle 1 + m\angle 4$
5. $m\angle 2 = m\angle 4$

1. Given
Given
2. Angle Add Post.
3. substitution Prop
4. substitution Prop
5. subtraction Prop

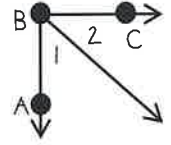
Your Turn: Simple Proof with Complementary Angles

Complete the brainstorming activities before beginning the proof.

Justify the steps for the proof of the conditional if $\angle 1$ and $\angle 2$ are complementary, then $\overrightarrow{BA} \perp \overrightarrow{BC}$.

Given: $\angle 1$ and $\angle 2$ are complementary

Prove: $\overrightarrow{BA} \perp \overrightarrow{BC}$



Brainstorm Area:

What do you know about complementary angles?

What do you know about the angle addition postulate?

What is a right angle?

What are perpendicular lines?

Statements	Reasons
1. $\angle 1$ and $\angle 2$ are complementary	1. <i>Given</i>
2. $m\angle 1 + m\angle 2 = 90^\circ$	2. <i>Def of comp \angle's</i>
3. $m\angle ABC = m\angle 1 + m\angle 2$	3. <i>Angle Addition Postulate</i>
4. $m\angle ABC = 90^\circ$	4. <i>Substitution Prop</i>
5. $\angle ABC$ is a right angle	5. <i>Def of \perp</i>
6. $\overrightarrow{BA} \perp \overrightarrow{BC}$	6. <i>Def of \perp</i>

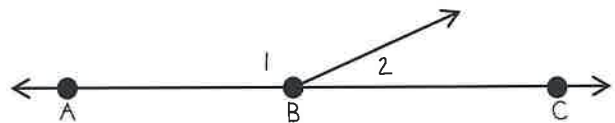
Your Turn: Writing a Two-Column Proof (Supplementary Angles)

Complete the brainstorming activities before beginning the proof.

Prove that if $\angle ABC$ is a straight angle, then $\angle 1$ and $\angle 2$ are supplementary.

Given: $\angle ABC$ is a straight angle

Prove: $\angle 1$ and $\angle 2$ are supplementary



Brainstorm Area:

What is a straight angle?

What do you know about the angle addition postulate?

What are supplementary angles?

Statements	Reasons
1. <i>$\angle ABC$ is a straight angle</i>	1. <i>Given</i>
2. <i>$m\angle ABC = 180^\circ$</i>	2. <i>Def. of str. \angle</i>
3. <i>$m\angle ABC = m\angle 1 + m\angle 2$</i>	3. <i>Angle addition Post</i>
4. <i>$m\angle 1 + m\angle 2 = 180$</i>	4. <i>Substitution Prop</i>
5. <i>$\angle 1$ & $\angle 2$ are supp.</i>	5. <i>Def of Suppl \angle</i>