

Pick up a bell ringer and find and sit in your new seat

Thursday 12/13

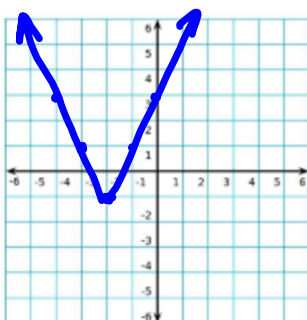
Simplify each expression.

1. $\frac{2xy^5z}{4xy^2z^2}$

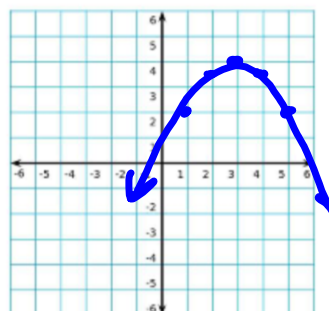
$$\frac{1y^3}{2z^2}$$

2. $4a^2b \cdot 3a^4b^{\frac{1}{2}} = 12a^6b^{\frac{3}{2}}$

3. Graph $y = 2|x + 2| - 1$



4. Graph $y = -\frac{1}{2}(x - 3)^2 + 4$



REVIEW

Explain to your neighbor how to solve for x

$$7x + 3 = 17$$

$$\frac{7x}{7} = \frac{14}{7}$$

$$x = 2$$

REVIEW

Explain to your neighbor how to solve for x

$$14 = \underline{3x} - 5 + \underline{6x}$$

$$\begin{array}{r} 14 = 9x - 5 \\ + 5 \quad + 5 \\ \hline 19 = 9x \\ \frac{19}{9} = x \end{array}$$

$$\begin{array}{l} 3x + 6x \\ x(3+6) \\ x(9) = 9x \end{array}$$

Unit 6: Reasons for Proofs

Algebraic Properties (Equality Only)

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 $a(c) = b(c)$

Division Property of equality If $a = b$, then $a/c = b/c$

Distributive Property: For Example: $3(x + 2) = 3x + 6$ $a(b + c) = ab + ac$

Properties used for both Equality and Congruence

Reflexive Property: (One Equation) Same on both sides of the equation. $a = a$

Symmetric Property: (Two Equations) If $a = b$ then $b = a$ $2 = x$ $x = 2$

Transitive Property: (Three Equations) If $a = b$ and $b = c$ then $a = c$

* Substitution Property: If $a = b$ then b can replace a in any expression.
 (Often used with simplifying and changing from \cong to $=$)
 *Combining like terms on one side

Lines and Angles (Congruence Only)

Angle Addition Postulate: The larger angle is congruent to the sum of the measure of the two adjacent angles.

Segment Addition Postulate: The larger segment is congruent to the sum of the segments that comprise it.

Definition of an angle bisector: An angle bisector divides the angle into two congruent angles.

Definition of supplementary Angles: All supplementary angles are congruent to 180°

Definition of a midpoint: A midpoint divides a segment into two equal segments.

Definition of a linear pair: Two angles that are adjacent and supplementary

Definition of vertical angles: A pair of opposite angles that are always congruent.

Definition of Complementary Angles: A pair of angles that sum to 90°

Definition of a Right Angle: An angle that measures 90°

Parallel Lines and Transversals

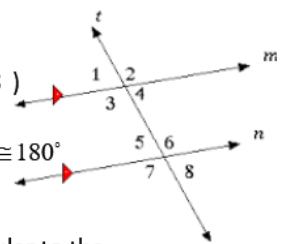
Alternate Interior Angles: Congruent ($\angle 3 \cong \angle 6$ and $\angle 4 \cong \angle 5$)

Corresponding Angles: Congruent ($\angle 1 \cong \angle 5$, $\angle 3 \cong \angle 7$, $\angle 2 \cong \angle 6$, $\angle 4 \cong \angle 8$)

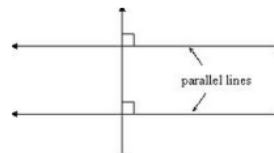
Alternate Exterior Angles: Congruent ($\angle 1 \cong \angle 8$ and $\angle 2 \cong \angle 7$)

Same Side Interior Angles: Supplementary ($\angle 3 + \angle 5 \cong 180^\circ$ and $\angle 4 + \angle 6 \cong 180^\circ$)

Converse of any of the above proves the lines are parallel



Perpendicular Transversal Theorem: If two lines in a plane are perpendicular to the same line, then they are parallel to each other.



Which property justifies the step?

$$4x + \cancel{5} = \cancel{11}$$

$$4x = 6$$

Subtraction P.O.E

$$4x + \cancel{5} = \cancel{5} = 11 - 5 \quad \underline{\text{Substitution}}$$

Which property justifies the step?

$$\begin{array}{l} 7x = 21 \\ \frac{1}{7} \rightarrow \\ x = 3 \end{array}$$

DIV. P.O.E

Which property justifies the step?

$$\frac{x}{2} = -3(2)$$

Mult. POE

$$x = -6$$

Which property justifies the step?

$$-2(3x + 1) = 7$$

$$-6x - 2 = 7$$

Distr. Prop

Which property justifies the step?

$$5 = x$$

$$x = 5$$

Symmetric

Which property justifies the step?

$$\begin{array}{l} 5x - 2x = 24 \\ \hline 3x = 24 \end{array}$$

Substitution

Which property justifies the step?

$$- 5 + 3x = 10$$


$$3x = 15$$

Add FOE

Which property justifies the step?

$$\begin{array}{c} \underline{2} + 7x - \underline{5} = 4x - 2x \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 7x - 3 = 2x \\ \underline{\quad} \end{array}$$

Substitution

When in our lives are we going to use proofs?

"You will need them every day, I hope, without knowing it. Geometry is beautifully logical, and it teaches you how to think and prove that things are so, step by step by step.

Proofs are excellent lessons in reasoning. Without logic and reasoning, you are dependent on jumping to conclusions or--worse--having empty opinions."

Marilyn vos Savant,

Name: _____ Hour: _____

6.1 A Algebraic Proofs

Give the reason for each statement in the following two-column proof.

1. \rightarrow Given: $3x + 6 = 7x - 2$
 Prove: $x = 2$

Statements	Reasons
1. $3x + 6 = 7x - 2$	1. Given
2. $6 = 4x - 2$ <i>(Handwritten: $3x - 3x$ above, $+2$ below)</i>	2. Subtraction P.O.E.
3. $8 = 4x$ <i>(Handwritten: $6 + 2$ above)</i>	3. Addition P.O.E.
4. $2 = x$ <i>(Handwritten: $8 \div 4$ above)</i>	4. Division P.O.E.
5. $x = 2$	5. Symmetric Property

2. Given: $2 - 6x + 4 = 3x - 14 + x$
 Prove: $x = 2$

Statements	Reasons
1. $2 - 6x + 4 = 3x - 14 + x$	1. Given
2. $6 - 6x = 3x - 14 + x$	2. Substitution
3. $6 - 6x = 4x - 14$	3. Substitution
4. $6 = 10x - 14$	4. addition P.O.E.
5. $20 = 10x$	5. add
6. $2 = x$	6. division P.O.E.
7. $x = 2$	7. Symmetric

Rebecca
 Abi H
 Brendon
 Matthew
 Nate
 Annika
 Elder

3. Given: $\frac{1}{4}x + 7y = 10 - y$
 Prove: $x = 40 - 32y$

Statements	Reasons
1. $\frac{1}{4}x + 7y = 10 - y$	1. Given
2. $\frac{1}{4}x + 7y - 7y = 10 - y - 7y$	2. Subtraction
3. $\frac{1}{4}x = 10 - 8y$	3. Substitution
4. $4\left(\frac{1}{4}x\right) = 4(10 - 8y)$	4. Multiplication
5. $x = 4(10 - 8y)$	5. Probably substitution
6. $x = 40 - 32y$	6. Distributive

Kalen
 Spencer
 Camdyn
 Brynn
 Isaac
 Emi

4. Given: $\begin{cases} a = 2 \\ -(-2a + 3b) = 6 \end{cases}$
 Prove: $b = -\frac{2}{3}$

Statements	Reasons
1. $-(-2a + 3b) = 6$	1. Given
2. $-2a + 3b = -6$	2. MULT/DIV POE
3. $b = 2a - 6$	3. Add POE
4. $b = \frac{2}{3}a - 2$	4. DIV POE
5. $a = 2$	5. Given
6. $b = \frac{4}{3} - 2$	6. Substitution
7. $b = -\frac{2}{3}$	7. Substitution

$b = \frac{2}{3}(2) - 2$

5. Given: $5(n-3) = 4(2n-7) - 14$
 Prove: $n = 9$

Statements	Reasons
1. $5(n-3) = 4(2n-7) - 14$	1. _____
2. $5n - 15 = 8n - 28 - 14$	2. _____
3. $5n - 15 = 8n - 42$	3. _____
4. $5n - 15 + 15 = 8n - 42 + 15$	4. _____
5. $5n = 8n - 27$	5. _____
6. $5n - 8n = 8n - 27 - 8n$	6. _____
7. $-3n = -27$	7. _____
8. $\frac{-3n}{-3} = \frac{-27}{-3}$	8. _____
9. $n = 9$	9. _____

6. Given: $4 - 7x = 2x - 23$
 Prove: $x = 3$

Statements	Reasons

7. Given: $\frac{1}{2}x + 6y = 8 - 3y$

→ Prove: $x = 16 - 18y$

Statements	Reasons
$\frac{1}{2}x + \cancel{6y} = 8 - \cancel{3y}$ $\frac{1}{2}x = 8 - 9y$ $2\left(\frac{1}{2}x\right) = 2(8 - 9y)$ $x = 2(8 - 9y)$ $x = 16 - 18y$	<p>Given</p> <p>Subtraction POE</p> <p>MULT POE</p> <p>Substitution</p> <p>DIST.</p>

8. Given: $3 - 2x + 12 = 4x - 7 - 2x$

Prove: $\frac{11}{2} = x$

Statements	Reasons

9. Given: $\begin{cases} a = -3 \\ 2b + a + 1 = 5 \end{cases}$
Prove: $b = \frac{7}{2}$

Statements	Reasons

10. Given: $-(n-5) = 2(3n-8) - 7$
Prove: $n = 4$

Statements	Reasons

6.1A due Monday :)