

Geometry Maintenance Assignment

Welcome to Geometry! In order to ensure success in this course, there is a mandatory summer assignment packet. This packet is due on the first day of your math class whether it occurs in first or second semester. While it is best to not put the assignment off to the last minute, you want to complete the assignment close enough to the start of your course so that the ideas are fresh. There will be an assessment on this material the first week of class, after the packet has been reviewed.

All topics in this assignment should be a review. You should not only be familiar with the topics but you should know them well enough to be tested on them. This is material that will not be taught in the course. It is expected that you come in with a strong understanding of these topics. If you are unsure of how to do these problems, feel free to seek help with them. There are many websites with helpful videos including Khan Academy, YouTube, mathisfun.com, purplemath.com, shmoop.com, and algebrahelp.com.

Give us your best work while giving yourself the opportunity to get off to a great start! We look forward to having you in class!!

Sincerely,
The Math Department

ALL PROBLEMS SHOULD BE SOLVED ON A SEPARATE SHEET OF LOOSE LEAF PAPER AND ALL WORK MUST BE SHOWN

1. Solving Linear Equations

1. $4x + 3 = 19$

2. $6(2x + 4) = 32$

3. $4x + 5 + 5x + 40 = 0$

4. $12 + 2x = 2 + 5x$

5. $2(4x + 4) = x + 1$

6. $2(x + 5) = 3(x - 2)$

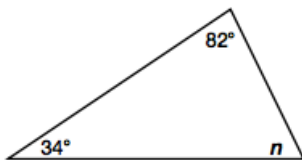
7. $\frac{1}{2}(6 + 4x) - \frac{1}{4}(8x - 12) = \frac{1}{2}(2x - 4)$

8. $5x - [7 - (2x - 1)] = 3(x - 5) + (x + 3)$

Find the missing angle in the triangle. Set up an algebraic expression and solve.

Hint: The sum of all three angles in a triangle add up to 180°

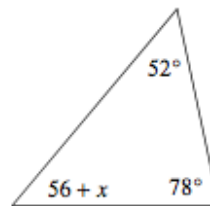
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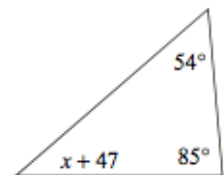
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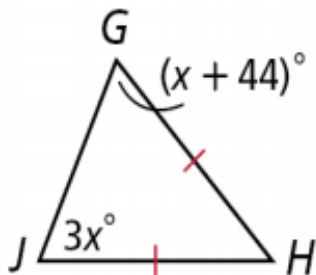
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12.



13. The measure of $\angle G = \text{measure } \angle J$



2. Algebraic Expression

Write an equation and Solve.

EX:

seven less than a number is 9

$$x - 7 = 9$$

$$x = 16$$

three times less than six times a number is five times the same number plus 5, then solve.

$$6x - 3 = 5x + 5$$

$$x - 3 = 5$$

$$x = 8$$

Write an equation and solve.

1. The product of five and a number decreased by seven equals thirteen.
2. Sixteen less than twice a number is 10.
3. Twice the sum of a number and seven is twenty
4. Half of a number is three times the sum of the number and five.

3. Solving Equations by Factoring

$$3x^2 + 14x + 8 = 0$$

$$(3x + 2)(x + 4) = 0$$

$$3x + 2 = 0 \text{ or } x + 4 = 0$$

$$x = -\frac{2}{3} \text{ or } x = -4$$

Solve the following quadratics equations by factoring.

1. $x^2 + 5x - 6 = 0$

2. $x^2 = 20x - 36$

3. $3x^2 - 13x - 10 = 0$

4. $6x^2 + 11x - 60 = 0$

4. Simplifying Radical Expressions

$$\begin{aligned}\sqrt{20} &= \sqrt{4} \sqrt{5} \\ &= 2\sqrt{5}\end{aligned}$$

$$\begin{aligned}(3\sqrt{5})^2 &= (3\sqrt{5})(3\sqrt{5}) \\ &= 9\sqrt{25} \\ &= 9 \cdot 5 \\ &= 45\end{aligned}$$

$$\begin{aligned}\sqrt{\frac{7}{3}} &= \frac{\sqrt{7}}{\sqrt{3}} \\ &= \frac{\sqrt{7}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \\ &= \frac{\sqrt{21}}{3}\end{aligned}$$

$$\begin{aligned}\frac{6}{\sqrt{5}} &= \frac{6}{\sqrt{5}} \frac{\sqrt{5}}{\sqrt{5}} \\ &= \frac{6\sqrt{5}}{\sqrt{5}\sqrt{5}} \\ &= \frac{6\sqrt{5}}{5}\end{aligned}$$

Write in Simplest radical form

1. $\sqrt{24}$

2. $\sqrt{300}$

3. $\sqrt{144}$

4. $3\sqrt{40}$

5. $\sqrt{50}$

6. $\sqrt{\frac{1}{4}}$

6.) $\sqrt{\frac{3}{5}}$

7. $\sqrt{\frac{250}{48}}$

8. $\frac{9}{\sqrt{2}}$

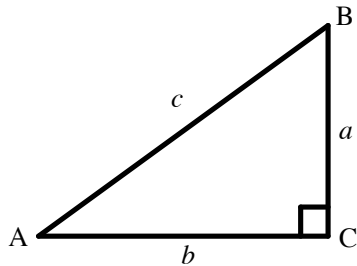
9. $(\sqrt{10})^2$

10. $(4\sqrt{5})^2$

11. $(-\sqrt{4})^2$

5. Pythagorean Theorem

Explanation:



$$a^2 + b^2 = c^2$$

Example: $a = 12$, $b = 35$, $c = ?$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ (12)^2 + (35)^2 &= c^2 \\ 144 + 1225 &= c^2 \\ 1369 &= c^2 \\ \sqrt{1369} &= c \\ 37 &= c \end{aligned}$$

Use the triangle above. Find the length of the missing side. Round answers to the nearest tenth. Remember: c is the hypotenuse.

1. $a = 3$, $b = 4$, $c = ?$

2. $a = 5$, $b = ?$, $c = 13$

3. $a = 5$, $b = 5$, $c = ?$

4. $a = ?$, $b = 7\sqrt{3}$, $c = 14$

5. $a = 6$, $b = ?$, $c = 9$

6. $a = 13$, $b = 17$, $c = ?$

Apply the Pythagorean Theorem. (Hint: Draw the scene)

7. A man leans a 8 ft. ladder against a house. The base of the ladder is 2ft from the house. To the nearest tenth how high on the house does the ladder reach?

8. The foot of a ladder is placed 6 feet from a wall. If the top of the ladder rests 8 feet up on the wall, how long is the ladder?

9. A soccer field is a rectangle 90 meters wide and 120 meters long. The coach asks players to run from one corner to the corner diagonally across. What is this distance?

6. Writing and Simplifying Ratios

EX 1 : Train A takes 35 minutes to travel its route. Train B, traveling the same route but making more stops, takes 47 minutes. What is the ratio of the time of Train A to Train B?

$$35 \text{ minutes to } 47 \text{ minutes} = \frac{35 \text{ minutes}}{47 \text{ minutes}} = \frac{35}{47} \text{ or } 35:47$$

EX 2: Sara's height is 4 feet, 7 inches. Her younger's sisters height is 25 inches. Find the ratio of Sara's height to her sister's.

Convert 4 feet, 7 inches to inches $4(12)+7= 55$ inches

Sara to Sisters

$$55 \text{ inches to } 25 \text{ inches} = \frac{55 \text{ inches}}{25 \text{ inches}} = \frac{55}{25} = \frac{11}{5} \text{ or } 11:5$$

Write the following ratios

1. Basmati rice needs to cook for 20 minutes, while quinoa (another grain) cooks for 25 minutes. What is the ratio of cooking times for rice to quinoa?

2. Jonathan caught 7 fish and Georgia caught 4. What is the ratio of fish caught of Jonathan to Georgia?

3. Two sunflowers' growth was measured daily. At the end of the experiment, Sunflower A had grown from 2 inches to 2 feet, 3 inches. Sunflower B had grown from 3 inches to 2 feet, 6 inches. Find the ratio of the growth in height of Sunflower A to Sunflower B.

7. Proportions

Examples:

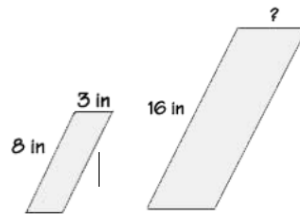
$$\frac{x+4}{5} = \frac{x-2}{3}$$

$$5(x-2) = 3(x+4)$$

$$5x - 10 = 3x + 12$$

$$2x = 22$$

$$x = 11$$



$$\frac{3}{8} = \frac{x}{16}$$

$$8x = 48$$

$$x = 6 \text{ in}$$

Solve the Proportions

1. $\frac{7}{3} = \frac{21}{x}$

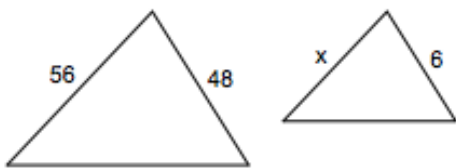
2. $\frac{10}{6x+7} = \frac{6}{2x+9}$

3. $\frac{2-4x}{-6} = \frac{6x-8}{10}$

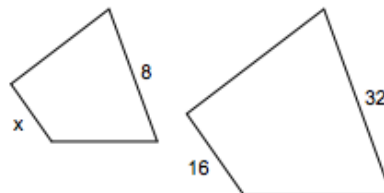
4. $\frac{2}{x-3} = \frac{x-2}{6}$

Solving Proportions involving similar figures

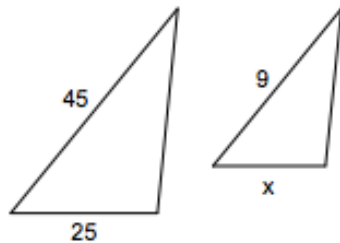
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6.



7.



8. Systems of Equations

Substitution Method

Example: Solve the system using the substitution method.

$$\begin{aligned}y &= 3x \\x + y &= -32 \quad \text{---} \rightarrow x + (3x) = -32 \\4x &= -32 \\x &= -8\end{aligned}$$

$$\begin{aligned}y &= 3(-8) \\y &= -24\end{aligned}$$

Solution: (-8, -24)

Use substitution to solve

1.
$$\begin{aligned}y &= x + 1 \\-2x + y &= 7\end{aligned}$$

2.
$$\begin{aligned}3y + 4x &= 15 \\2x + y &= -3\end{aligned}$$

Elimination Method

Example: Solve the system using the elimination method.

$$\begin{aligned}2x + 5y &= 17 \\6x - 5y &= -9 \\8x &= 8 \\x &= 1 \quad \text{---} \rightarrow 2(1) + 5y = 17, \text{ so } y = 3\end{aligned}$$

solution (1, 3)

Use Elimination to solve

1.
$$\begin{aligned}5x - 6y &= -32 \\3x + 6y &= 48\end{aligned}$$

2.
$$\begin{aligned}3x + 2y &= 1 \\4x + 3y &= -2\end{aligned}$$

Solve by any algebraic method you choose:

3. $2x + 37 = 9$
 $x + 5y = 8$

4. $9x + 8y = 15$
 $9x + 8y = 30$

5. $4x - 8y = 15$
 $-5x + 10y = -30$

6. $4x - 7y = 15$
 $-8x + 14y = -30$

9. Quadratic Formula

Use the quadratic formula to solve.

To solve $ax^2 + bx + c = 0$,

the quadratic formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

$$2x^2 + 3x - 5 = 0$$

$$A = 2, B = 3, C = -5$$

$$X = \frac{-3 \pm \sqrt{3^2 - 4(2)(-5)}}{2(2)}$$

$$X = \frac{-3 \pm \sqrt{9 + 40}}{4}$$

$$X = \frac{-3 \pm \sqrt{49}}{4}$$

$$X = \frac{-3 \pm 7}{4}$$

$$X = -\frac{5}{2} \text{ or } 1$$

$$x^2 - 2x - 4 = 0$$

$$A = 1, B = -2, C = -4$$

$$X = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-4)}}{2(1)}$$

$$X = \frac{2 \pm \sqrt{4 + 16}}{2}$$

$$X = \frac{2 \pm \sqrt{20}}{2} = \frac{2 \pm 2\sqrt{5}}{2}$$

$$= \frac{2}{2} \pm \frac{2\sqrt{5}}{2}$$

$$= 1 \pm \sqrt{5}$$

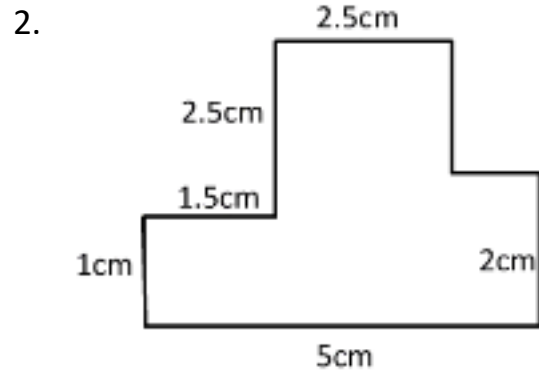
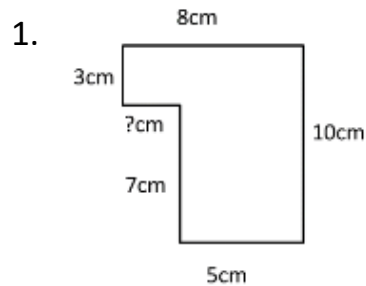
Write your answer in simplest radical form if needed.

1. $x^2 - 5x - 24 = 0$

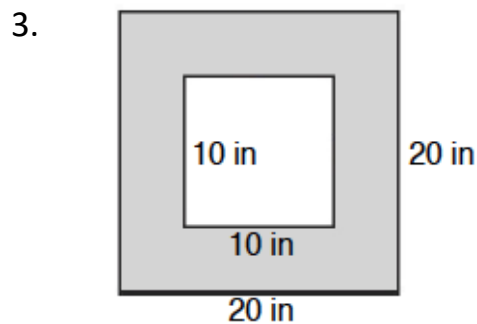
2. $2x^2 - 5x + 1 = 0$

10. Perimeter and Area

Find the area and perimeter of each figure.



Find the area of the shaded region in each figure.



- The perimeter of a rectangle is 38 m. The length is four more than two times the width. What is the width?
- The perimeter of a rectangle is 106 mm. The length is one more than three times the width. What is the area?
- A rectangle has a length that is 2 less than 3 times the width. If the area of this rectangle is 16, find the dimensions and the perimeter.