

Algebra to Geometry/Summer Packet
Slope-Intercept and Point-Slope

Need Help?.....

<http://www.virtualnerd.com/algebra-1/linear-equation-analysis/slope-from-two-points.php>

<http://www.virtualnerd.com/pre-algebra/linear-functions-graphing/graph-line-given-slope-intercept.php>

<http://www.virtualnerd.com/algebra-1/linear-equation-analysis/point-slope-line-direct-example.php>

Find the slope of a line that passes throu the following points. $\frac{y_2 - y_1}{x_2 - x_1}$

1. (5,3) and (7,8) 2. (-4,3) and (2,5) 3. (-4,7) and (4,12)

Give an equation in point-slope form that satisfies the given information.

4. Passes through (2,3) and has a slope of $-\frac{1}{2}$. 5. Passes through (-1,4) and $m = 3$. 6. Passes through the points (5,7) and (6,9).

**Hint: First find the slope.

$y - y_1 = m(x - x_1)$

$y - \square = \square (x - \square)$ _____

Give an equation in slope-intercept form that satisfies the given information.

7. Passes through (-4,3) and has a slope of 5. 8. Passes through (0,2) and has a slope of $-\frac{5}{3}$. 9. Passes through (4,-2) and $m = 0$.

$y = mx + b$

$Y = \underline{\hspace{1cm}}x + \underline{\hspace{1cm}}$ _____

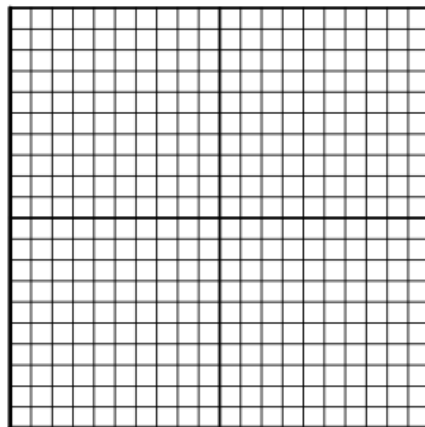
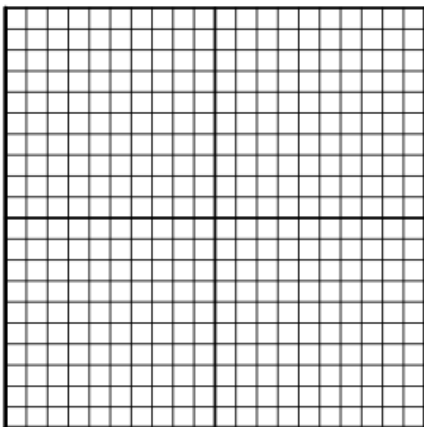
Graph each of the following lines by first giving the point and the slope.

10. $y + 2 = 3(x - 1)$

11. $y = -\frac{1}{2}x + 3$

Point _____ Slope _____

Point _____ Slope _____



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Factoring a Monomial from a Polynomial

Factor by Using the Distributive Property The Distributive Property has been used to multiply a polynomial by a monomial. It can also be used to express a polynomial in factored form. Compare the two columns in the table below.

| Multiplying | Factoring |
|--|--|
| $3(a + b) = 3a + 3b$ | $3a + 3b = 3(a + b)$ |
| $x(y - z) = xy - xz$ | $xy - xz = x(y - z)$ |
| $6y(2x + 1) = 6y(2x) + 6y(1)$ $= 12xy + 6y$ | $12xy + 6y = 6y(2x) + 6y(1)$ $= 6y(2x + 1)$ |

Example 1 Use the Distributive Property to factor $12mn + 80m^2$.

Find the GCF of $12mn$ and $80m^2$.

$$12mn = 2 \cdot 2 \cdot 3 \cdot m \cdot n$$

$$80m^2 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot m \cdot m$$

$$\text{GCF} = 2 \cdot 2 \cdot m \text{ or } 4m$$

Write each term as the product of the GCF and its remaining factors.

$$\begin{aligned} 12mn + 80m^2 &= 4m(3 \cdot n) + 4m(2 \cdot 2 \cdot 5 \cdot m) \\ &= 4m(3n) + 4m(20m) \\ &= 4m(3n + 20m) \end{aligned}$$

$$\text{Thus } 12mn + 80m^2 = 4m(3n + 20m).$$

Example 2 Factor

$6ax + 3ay + 2bx + by$ by grouping.

$$\begin{aligned} 6ax + 3ay + 2bx + by &= (6ax + 3ay) + (2bx + by) \\ &= 3a(2x + y) + b(2x + y) \\ &= (3a + b)(2x + y) \end{aligned}$$

Check using the FOIL method.

$$\begin{aligned} (3a + b)(2x + y) &= 3a(2x) + (3a)(y) + (b)(2x) + (b)(y) \\ &= 6ax + 3ay + 2bx + by \checkmark \end{aligned}$$

Use the GCF to factor each polynomial.

| | |
|-------------------------|-----------------------|
| 1. $21x - 14$ | 4. $10m^2 + 35m$ |
| 2. $3x^2 + 6x^4$ | 5. $8w^4 - 12w^2 - 4$ |
| 3. $12x^3 + 6x^2 - 18x$ | 6. $5xy + 25y$ |

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Factoring Trinomials

Need Help?..... <http://www.virtualnerd.com/algebra-1/polynomials-and-factoring>

| | | |
|--|---|--|
| $b^2 + 8b + 7$ $\underline{\quad} \times \underline{\quad} = 7$ $\underline{\quad} + \underline{\quad} = 8$ $(b + \underline{\quad})(b + \underline{\quad})$ | | $m^2 + m - 90$ $\underline{\quad} \times \underline{\quad} = -90$ $\underline{\quad} + \underline{\quad} = 1$ $(m + \underline{\quad})(m - \underline{\quad})$ |
| $2k^2 + 22k + 60$ $\underline{\quad} \times \underline{\quad} = 30$ $\underline{\quad} + \underline{\quad} = 11$ $\underline{\quad}(\quad)(\quad)$ | <p align="center"><-- TAKE OUT GCF</p> | $m^2 + 2m - 24$ $\underline{\quad} \times \underline{\quad} = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$ $(\quad)(\quad)$ |
| $4n^2 - 17n + 4$ $\underline{\quad} \times \underline{\quad} = 16$ $\underline{\quad} + \underline{\quad} = -17$ $(\quad)(\quad)$ | <p align="center">TAKE OUT GCF--></p> | $15n^2 + 35n + 20$ $\underline{\quad} \times \underline{\quad} = 4$ $\underline{\quad} + \underline{\quad} = 2$ $\underline{\quad}(\quad)(\quad)$ |

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Solving Equations

Need Help?... <http://www.virtualnerd.com/pre-algebra/inequalities-multi-step-equations/equations/solve-multiple-step-equations/order-of-operations-in-reverse>

<http://www.virtualnerd.com/pre-algebra/rational-numbers/reciprocal-multiplication-two-steps.php>

| | |
|-------------------------|-----------------------------|
| 1. $h - 26 = -29$ | 7. $3x - 2 = -5$ |
| 2. $41 = 32 - r$ | 8. $5 - 7w = 23 + 2w$ |
| 3. $5x = -45$ | 9. $\frac{3}{2}a - 8 = 7$ |
| 4. $-8y = -64$ | 10. $7 = \frac{c}{-5} + 3$ |
| 5. $\frac{h}{10} = -25$ | 11. $\frac{z - 7}{5} = -3$ |
| 6. $\frac{2}{5}t = -10$ | 12. $\frac{2t - 5}{-9} = 7$ |

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Solve Proportions

Need Help? <http://www.virtualnerd.com/geometry/similarity/ratios-proportions>

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

2. $\frac{40}{65} = \frac{2z}{104}$

3. $\frac{5}{2} = \frac{65}{m}$

4. $\frac{15}{y+2} = \frac{40}{12}$

5. $\frac{20}{5} = \frac{x}{2}$

6. $\frac{2y}{y+4} = \frac{16}{10}$

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Simplifying Radicals

To simplify a radical, factor the expression under the radical sign to its prime factors. For every pair of like factors, bring out one of the factors. Multiply whatever is outside the sign, then multiply whatever is inside the sign. Remember that for each pair, you “bring out” only one of the numbers.

$$\sqrt{4} = 2 \text{ because } 2 \text{ is a factor used twice } (2 \times 2 = 4). \quad \sqrt{9} = 3 \text{ because } 3 \text{ is a factor used twice } (3 \times 3 = 9)$$

$\begin{array}{c} \diagup \quad \diagdown \\ 2 \quad 2 \\ 2 \quad 2 \end{array}$

$\begin{array}{c} \diagup \quad \diagdown \\ 3 \quad 3 \\ 3 \quad 3 \end{array}$

Examples:

| | | | |
|---|--|---|--|
| $\sqrt{28}$ $\begin{array}{c} 7 \quad 4 \\ 7 \quad 2 \quad 2 \\ 2\sqrt{7} \end{array}$ | $\sqrt{54}$ $\begin{array}{c} 9 \quad 6 \\ 3 \quad 3 \quad 3 \quad 2 \\ 3\sqrt{2 \times 3} = 3\sqrt{6} \end{array}$ | $\sqrt{150}$ $\begin{array}{c} 15 \quad 10 \\ 3 \quad 5 \quad 2 \quad 5 \\ 5\sqrt{3 \times 2} = 5\sqrt{6} \end{array}$ | $\sqrt{720}$ $\begin{array}{c} 72 \quad 10 \\ 9 \quad 8 \quad 2 \quad 5 \\ 3 \quad 3 \quad 2 \quad 2 \quad 2 \quad 2 \quad 5 \\ 3 \times 2 \times 2\sqrt{5} = 12\sqrt{5} \end{array}$ |
|---|--|---|--|

Simplify completely:

1. $\sqrt{16}$ 2. $\sqrt{32}$ 3. $\sqrt{50}$ 4. $\sqrt{80}$ 5. $\sqrt{72}$

6. $\sqrt{120}$ 7. $\sqrt{68}$ 8. $\sqrt{200}$ 9. $\sqrt{180}$ 10. $\sqrt{125}$

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Evaluate Algebraic Expressions

Need Help? http://www.virtualnerd.com/tutorials/?id=Alg1_01_01_0001

Evaluate each expression using the given value(s).

$$3x^2 + 2y - 5z$$

$$\text{for: } x = 5, y = -2, z = -1$$

$$|4m - 1| + 8n$$

$$\text{for: } m = -4, n = 3$$

$$\frac{a(bc - 6)}{5 + c^2}$$

$$\text{for: } a = 7, b = -1, c = -3$$

$$4(d + 5)^3 - 2d + e$$

$$\text{for: } d = 2, e = 9$$

$$\sqrt{36} - p(8 - r)$$

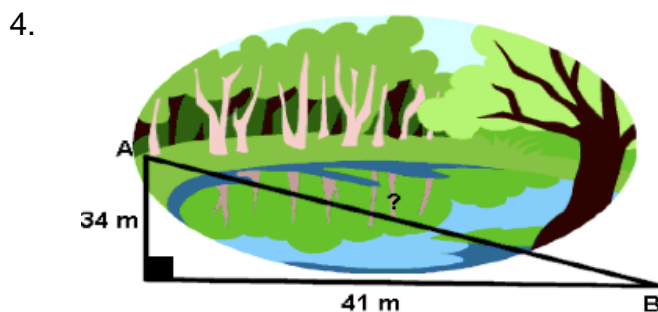
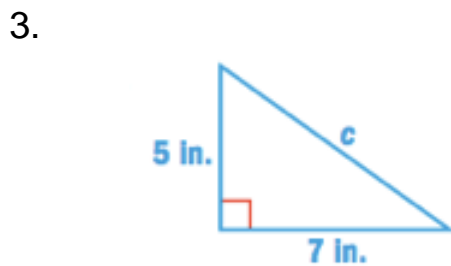
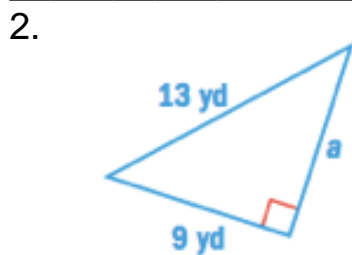
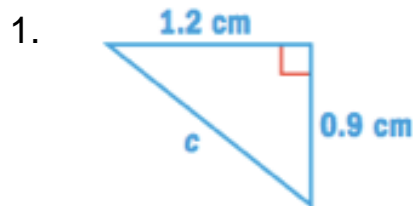
$$\text{for: } p = \frac{1}{2}, r = 6$$

Algebra to Geometry Summer Packet Pythagorean Theorem

Need Help?... <http://www.virtualnerd.com/pre-algebra/real-numbers-right-triangles/pythagorean-theorem/right-triangles-pythagorean-theorem/pythagorean-theorem-definition>

<http://www.virtualnerd.com/pre-algebra/real-numbers-right-triangles/pythagorean-theorem/pythagorean-theorem-examples/leg-length-right-triangle-solution>

Find the unknown length. Round your answer to the nearest tenth if necessary.



To get from point A to point B you must avoid walking through a pond. To avoid the pond, you must walk 34 meters south and 41 meters east. To the *nearest meter*, how many meters would be saved if it were possible to walk through the pond?

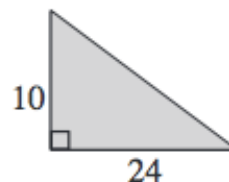
5.



A baseball diamond is a square with sides of 90 feet. What is the shortest distance, to the *nearest tenth* of a foot, between first base and third base?

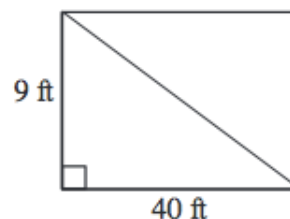
6.

Use the Pythagorean Theorem to find the unknown side of the right triangle. Simplify your answer. Write an exact answer, using radicals as needed.



7.

The side lengths of a rectangular room are 9 ft and 40 ft. The room is going to be split in half along the hypotenuse of a triangle using string. Find the length of the piece of string needed. Simplify your answer.



(This figure is not drawn to scale.)

Algebra to Geometry Summer Packet
Graphing Points in the Coordinate Plane

Need Help?... http://www.virtualnerd.com/tutorials/?id=Alg1_9_1_1

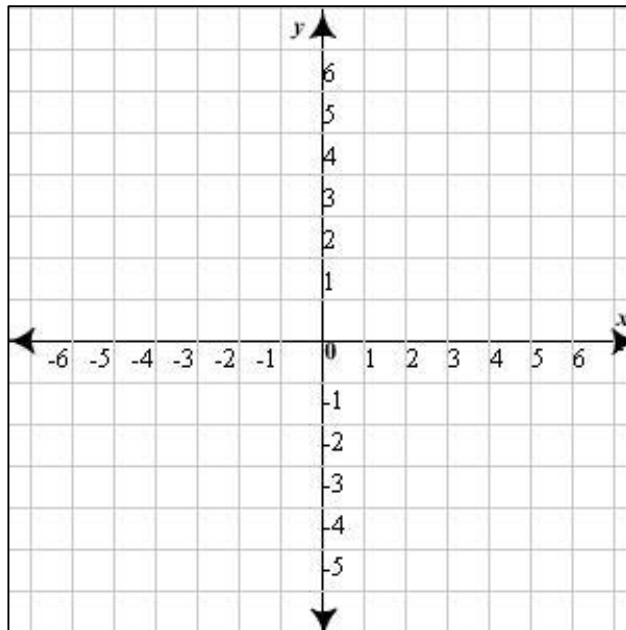
Plot and label each point.

A(4,3) B(-6,1)

C(4,-4) D(-2,7)

E(-5,-3) F(0,-1)

G(6,0) H(1,6)



State the coordinates of each point

A _____

B _____

C _____

D _____

E _____

F _____

G _____

H _____

I _____

J _____

K _____

L _____

