* Worked Out Answer Key *

2017 SUMMER REVIEW FOR STUDENTS ENTERING GEOMETRY

The following are topics that you will use in Geometry and should be retained throughout the summer. Please use this practice to review the topics you have learned and to keep your skills sharp. After each section, you will be given the opportunity to apply that particular skill to a geometry problem!

- Solve Multi-step Linear Equations
- Solve Linear Systems of Equations
- Write the Equation of a Line
- Factor Polynomials
- Simplifying Radicals/Operations on Radicals
- Perform Operations on Radicals
- Solve Quadratic Equations

Algebra Skills Review **Name:** Key

To be a successful geometry student, you need a **strong** background in algebra!

TOPIC: SOLVING LINEAR EQUATIONS

Solve the following equations. Simplify fractions if necessary!

1) $2(9 - x) = 6$

$18 - 2x = 6$

$-18 \quad\quad -18$

$-2x = -12$

$\frac{-2x}{-2} = \frac{-12}{-2}$

$\boxed{x = 6}$

2) $6x + \cancel{12} = 90$

$\cancel{-12} \quad -12$

$6x = 78$

$\frac{6x}{6} = \frac{78}{6}$

$\boxed{x = 13}$

3) $\cancel{3} \cdot \cancel{\frac{1}{3}}x = 5 \cdot \frac{3}{1}$

$\boxed{x = 15}$

EX) $x - 18 + 4x = 10x + 27$

$5x - 18 = 10x + 27$

$-10x \quad\quad -10x$

$-5x - 18 = 27$

$+18 \quad +18$

$-5x = 45$

$\frac{-5x}{-5} = \frac{45}{-5}$

$\boxed{x = -9}$

STEP 1: Combine like terms!

STEP 2: Move the variable to 1 side of the equation & #'s to the opposite side!

STEP 3: Isolate the variable by ÷ both sides by −5.

Solve the following multi-step equations. Simplify fractions if necessary.

4) $-27 = 2w + 3(w - 4)$

$-27 = 2w + 3w - 12$

$-27 = 5w - \cancel{12}$

$+12 \quad\quad \cancel{+12}$

$-15 = 5w$

$\frac{-15}{5} = \frac{5w}{5}$

$\boxed{-3 = w}$

5) $(6x + 3) + (8x - 11) = 90$

$14x - 8 = 90$

$+8 \quad +8$

$14x = 98$

$\frac{14x}{14} = \frac{98}{14}$

$\boxed{x = 7}$

6) $45 + 5(x + 6) = 180$

$45 + 5x + 30 = 180$

$\cancel{75} + 5x = 180$

$\cancel{-75} \quad\quad -75$

$5x = 105$

$\frac{5x}{5} = \frac{105}{5}$

$\boxed{x = 21}$

7) $6x - 20 = 2\cancel{x} + 50$

$-2x \quad\quad \cancel{-2x}$

$4x - 20 = 50$

$+20 \quad +20$

$4x = 70$

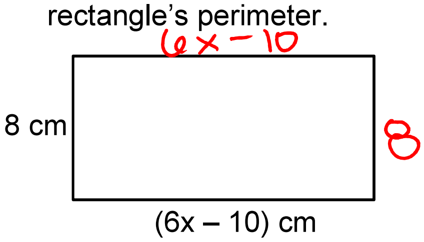
$\frac{4x}{4} = \frac{70}{4}$

$\boxed{x = 17.5}$

*note: Yes, decimals are okay!

opp sides =

<u>GEOMETRY APPLICATION</u> Given the area of the rectangle below is 112 cm^2, find x and the rectangle's perimeter.



$A = l \cdot w$

$112 = 8(6x-10)$

$112 = 48x - 80$

$+80 \quad +80$

$\frac{192}{48} = \frac{48x}{48}$

14, 8, 8, $6(4)-10$, 14

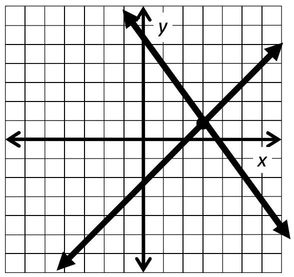
x = 4

$=8+14+8+14$

Per = 112 cm

TOPIC: <u>SOLVING A SYSTEM OF LINEAR EQUATIONS</u>

~Recall: There are 3 methods you can use to solve a system: Substitution, Elimination & Graphing. All methods have the same goal: find the point of intersection of the 2 linear equations. That point is the solution. Below models a solution to a system of linear equations.



The solution is: $\boxed{(3, 1)}$

Here are 2 worked out examples using substitution and elimination. The solution to a system is an ordered pair: (x, y). Please write the solution as an ordered pair.

<u>Substitution</u> (make sure to isolate a variable):

EX) $\begin{cases} y = x - 3 \\ 2x - 3y = -3 \end{cases}$

$y = 12 - 3$

$y = 9$

$2x - 3(x-3) = -3$

$2x - 3x + 9 = -3$

$\quad -9 \quad -9$

$-x = -12$

$x = 12$

Solution: $(12, 9)$

<u>Elimination</u> (equations in standard form): $Ax + By = C$

EX) $\begin{cases} 2x + y = -9 \;) \ast -2 \\ 4x + 11y = 9 \end{cases}$

$-4x$

$-4x - 2y = 18$

$\frac{9y}{9} = \frac{27}{9}$

$y = 3$

$2x + 3 = -9$

$\quad -3 \quad -3$

$\frac{2x}{2} = \frac{-12}{2}$

$x = -6$

Solution: $(-6, 3)$

8) Practice solving the following systems using either method (think about which method is best!).

a) $\begin{cases} -8x + 2y = -12 \\ y = -5x + 3 \end{cases}$

$-8x + 2(-5x+3) = -12$

$-8x - 10x + 6 = -12$

$-18x + 6 = -12$

$\quad -6 \quad -6$

$\frac{-18x}{-18} = \frac{-18}{-18}$

$\boxed{x = 1}$

*now plug in 1 for x:

$y = -5(1) + 3$

$= -5 + 3$

$\boxed{y = -2}$

Solution: $(1, -2)$

b) $\begin{cases} (x + 2y = -19) \ast -5 \\ 5x - 3y = 9 \end{cases}$

$-5x - 10y = 95$

Add going down

$\frac{-13y}{-13} = \frac{104}{-13}$

$\boxed{y = -8}$

$x + 2(-8) = -19$

$x - 16 = -19$

$+16 \quad +16$

$\boxed{x = -3}$

Solution: $(-3, -8)$

c) $\begin{cases} (2x + 3y = 22) \ast -3 \\ 6x + y = 2 \end{cases}$

$-6x - 9y = -66$

add

$\frac{-8y}{-8} = \frac{-64}{-8}$

$\boxed{y = 8}$

$6x + 8 = 2$

$\quad -8 \quad -8$

$\frac{6x}{6} = \frac{-6}{6}$

$\boxed{x = -1}$

Solution: $(-1, 8)$

d) $\begin{cases} (5x - 3y = -1)*-1 \\ 5x - 4y = 7 \end{cases}$

$-\cancel{5x} + 3y = 1$

$-y = 8$, $\frac{-y}{-1} = \frac{8}{-1}$

$\boxed{y = -8}$

$5x - 4(-8) = 7$

$5x + 32 = 7$

$-32 \quad -32$

$\frac{5x}{5} = \frac{-25}{5}$ $\boxed{x = -5}$

Solution: $(-5, -8)$

e) $\begin{cases} (2x + 3y = -10)*2 \\ -4x + 5y = -2 \end{cases}$

$\cancel{4x} + 6y = -20$

$\frac{11y}{11} = \frac{-22}{11}$

$\boxed{y = -2}$

$2x + 3(-2) = -10$

$2x - 6 = -10$

$+6 \quad +6$

$2x = -4$

$\boxed{x = -2}$

Solution: $(-2, -2)$

*elim "x", so make 18x + −18x

f) $\begin{cases} (9x - 7y = -2)*2 \\ 2y - 2x = -4 \end{cases}$

rewrite

$(-2x + 2y = -4)*9$

$-18x + 18y = -36$

$18x - 14y = -4$

$\frac{4y}{4} = \frac{-40}{4}$

$\boxed{y = -10}$

$2(-10) - 2x = -4$

$-20 - 2x = -4$

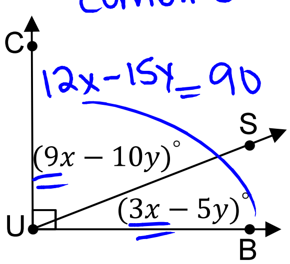
$+20 \quad +20$

$-2x = \frac{16}{-2}$ $\boxed{x = -8}$

Solution: $(-8, -10)$

<u>GEOMETRY APPLICATION</u> In Geometry you will learn about right angles (an angle whose measure is 90°) and straight angles (an angle whose measure is 180°). Solve for x and y in the diagram below and then find the measure of $\measuredangle LTH$.

Combine like terms!



$\begin{cases} (12x - 15y = 90)*2 \rightarrow 24x - \cancel{30y} = 180 \\ (16x + 10y = 180)*3 \rightarrow 48x + \cancel{30y} = 540 \end{cases}$

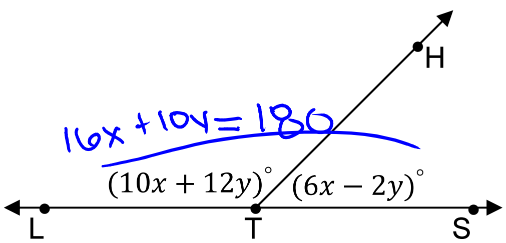
$\frac{72x}{72} = \frac{720}{72}$

$\boxed{x = 10}$

$12(10) - 15y = 90$

-120

$-15y = \frac{-30}{-15}$



$10x + 12y$

$10(10) + 12(2)$

x = 10 y = 2 m∠LTH = 124°

TOPIC: WRITING THE EQUATION OF A LINE

~Recall: You can write a linear equation in slope-intercept form, point-slope form and standard form. We will stick to slope-intercept form in Geometry (y = mx + b), however you can use either method to get to the final slope-intercept equation.

When you write an equation of a line, you have to have the **<u>SLOPE</u>** and the **<u>Y-INTERCEPT!</u>**

You can write the equation using two different methods…..

Slope-Intercept Form →Find "B" OR Point-Slope Form →Distribute & Isolate

$y = mx + b$ $\qquad$ $y - y_1 = m(x - x_1)$

Example: I will use both methods to write an equation of the line through the point (2, 3) that has a slope of 5.

Find "b"

① $y = mx + b$

$3 = 5(2) + b$

$3 = 10 + b$

$-10 \quad -10$

$-7 = b$

*isolate "b"

OR

② Pt. Slope

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

#'s have opp. signs!

$y - 3 = 5(x - 2)$

$y - 3 = 5x - 10$

$+3 \quad +3$

*isolate "y"

$y = 5x - 7$

Eq: $y = 5x - 7$

9) Write the equation of the line that passes through the given point P and has the given slope.

a) P (–6, 5), slope = 2

$y = mx + b$

$5 = 2(-6) + b$

$5 = -12 + b$

$+12 \quad +12$

$17 = b$

EQ: $y = 2x + 17$

b) P (15, –8) slope is $-\frac{2}{5}$

$y = mx + b$

$-8 = -\frac{2}{\cancel{5}}(\cancel{15}^{3}) + b$

$-8 = -6 + b$

$+6$

$b = -2$

EQ: $y = -\frac{2}{5}x - 2$

Note: If you do not have the slope, use the slope formula then find the y-intercept by plugging in either point.

Slope = $\frac{\text{rise}}{\text{run}}$ Given two points (x_1, y_1) and (x_2, y_2), then slope (m) is: $\boxed{\frac{y_2 - y_1}{x_2 - x_1}}$

10) Write an equation of the line that passes through (–2, 5) and (2,–1) in slope-intercept form.

1st find the slope!

$m = \frac{-1-5}{2 - -2} = \frac{-6}{4} = \boxed{\frac{-3}{2}}$

2nd find y-int!

$y = mx + b$

$5 = -\frac{3}{\cancel{2}}(\cancel{-2}) + b$

$5 = 3 + b$

-3

$2 = b$

EQ: $y = -\frac{3}{2}x + 2$

GEOMETRY APPLICATIONS

A) Find the equation of a line, in point-slope form, that is parallel to y = 4x – 3 through point (–2, 7). *recall: parallel lines have the same slope!

$7 = 4(-2) + b$

$7 = -8 + b$

$+8 \quad +8$

$15 = b$

Eqn: $y = 4x + 15$

B) Write the equation of a line, in slope-intercept form, that is perpendicular to y = –4x – 6 and passes through the point (–28, –16). *recall: perpendicular lines have opposite reciprocal slopes! Example of opposite reciprocal slopes: 2/5 and -5/2.

opp. recip. slope of -4 is $\boxed{+\frac{1}{4}}$.

use new slope!

$y = mx + b$

$-16 = \frac{1}{4}(-28) + b$

$-16 = -7 + b$

$+7$

$-9 = b$

Eqn: $y = \frac{1}{4}x - 9$

TOPIC: FACTORING QUADRATICS

Factoring Trinomials with a leading coefficient of one ($x^2 + bx + c$, $a = 1$)

We know how to multiply this: $(x-5)(x+2)$ and get $x^2-3x-10$

Now you are being asked to undo: $x^2-3x-10$ into their factors: $(x-5)(x+2)$

Questions to help: What multiplies to give you "c" and adds to give you "b"

11) Factor the following:

a) $x^2 + 11x + 18$

Remember to ask yourself.... What multiplies to = 18 and adds to = 11??

$(x+9)(x+2)$

$9x$
$2x$
$=11x$ ✓

Answer: $(x+9)(x+2)$

b) $m^2 + m - 20$

Remember to ask yourself.... What multiplies to = –20 and adds to = 1??

Answer: $(x+5)(x-4)$

c) $n^2 - 6n + 8$

Answer: $(n-4)(n-2)$

d) $t^2 - 8t + 12$

Answer: $(t-6)(t-2)$

e) $x^2 + 3x + 2$

Answer: $(x+2)(x+1)$

f) $w^2 + 6w - 16$

Answer: $(w+8)(w-2)$

g) $y^2 + 3y - 10$

Answer: $(y+5)(y-2)$

h) $x^2 + 8x + 12$

Answer: $(x+6)(x+2)$

Recall: When the leading coefficient is not 1.....

EX) Factor $2x^2 - 7x + 3$

+ *

$(2x-1)(x-3)$

$1x$
$6x$
$-7x$

Answer: $(2x-1)(x-3)$

EX) Factor $3n^2 + 14n - 5$

$(3n-1)(n+5)$

$-1n$
$15n$
$14n$

Answer: $(3n-1)(n+5)$

12) Factor the following trinomials.

a) $3t^2 + 8t + 4$

$(3t+2)(t+2)$

$2t$
$6t$
$=8t$ ✓

Answer: $(3t+2)(t+2)$

b) $4s^2 - 9s + 5$

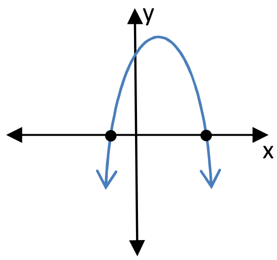
Answer: $(4s-5)(s-1)$

c) $2h^2 + 13h - 7$

Answer: $(2h-1)(h+7)$

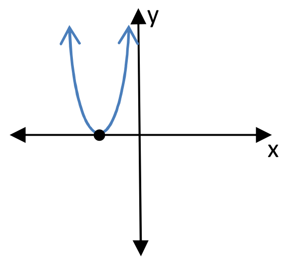
TOPIC: SOLVING QUADRATICS

Now that we reviewed factoring quadratics, let's remember what it MEANS visually to SOLVE a quadratic equation. The shape of a **quadratic function** is a U-shaped graph called a **parabola**. When we SOLVE quadratic functions, there can be 2 solutions, 1 solution, or no solution as seen below. The solutions are the x-intercepts of the parabola (also called "zeros").



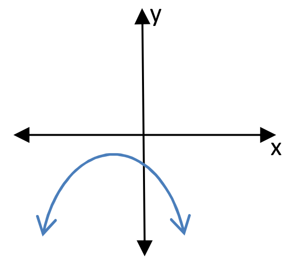
2 solutions

(has 2 x-intercepts)



1 solution

(has 1 x-intercept)



No solution

(never crosses x-axis, so no x-intercepts)

FINDING X-INTERCEPTS ON YOUR TI-CALCULATOR:

* Make sure the quadratic equation is in standard form (**set = 0**)
* Plug in the function to Y_1 and set $Y_2 = 0$ (since x-intercepts always have a y value of 0).
* Use [2nd] [TRACE] #5: INTERSECT to find the x-intercept(s) of the function.

NOTE WHEN SOLVING: ① Set the Equation = to 0.
② Factor out a GCF! set each factor = 0 + solve!

Solve the following:

EX) $2x^2 + 8x = 0$

$2x(x+4)=0$

$\frac{2x}{2}=\frac{0}{2}$ $\quad$ $x+4=0$, $-4\ -4$

$\boxed{x=0}$ $\quad$ $\boxed{x=-4}$

EX) $6n^2 = 15n$

$-15n\ -15n$

$6n^2-15n=0$

$3n(2n-5)=0$

$3n=0$ $\quad$ $2n-5=0$

$\boxed{n=0}$ $\quad$ $2n=5$, $\frac{5}{2}$ $\quad$ $\boxed{n=2.5}$

EX) $x^2 + 3x = 18$

$x^2+3x-18=0$

$(x+6)(x-3)=0$

$x+6=0$, $-6\ -6$ $\quad$ $x-3=0$, $+3\ +3$

Answer: $x=-6, 3$

13) Solve the following equations (by factoring).

a) $15x^2 + 35x = 0$

$5x(3x+7)=0$

$\frac{5x=0}{5}$ $\quad$ $3x+7=0$, $-7\ -7$

$\boxed{x=0}$ $\quad$ $3x=\frac{-7}{3}$

Answer: $x=0, -7/3$

b) $x^2 - 3x = 28$

$-28\ -28$

$x^2-3x-28=0$

$(x-7)(x+4)=0$

$x-7=0$, $+7\ +7$, $x=7$ $\quad$ $x+4=0$, $-4\ -4$, $x=-4$

Answer: $x=7,-4$

c) $s^2 - 2s = 24$

$-24\ -24$

$s^2-2s-24=0$

$(s-6)(s+4)=0$

Answer: $s=6,-4$

14) Factor and solve the following trinomials.

a) $x^2 + 10x = -21$

$+21 \quad +21$

$x^2 + 10x + 21 = 0$

$(x+3)(x+7) = 0$

$x+3=0 \qquad x+7=0$

Answer: $x = -3, -7$

b) $x^2 - 33 = 8x$

$-8x \quad -8x$

$x^2 - 8x - 33 = 0$

$(x-11)(x+3) = 0$

Answer: $x = 11, -3$

c) $2x^2 - 3x - 20 = 0$

$(2x+5)(x-4) = 0$

$2x+5=0 \qquad x = 4$

$2x = -5$

$x = -\frac{5}{2}$

Answer: $x = -2.5, 4$

GEOMETRY APPLICATION

Given the labeled rectangle below whose area is 70 mm^2. Find x.

x *mm*

(x + 9) *mm*

$A = l \cdot w$

$70 = x(x+9)$

$70 = x^2 + 9x$

$-70 \qquad -70$

$0 = x^2 + 9x - 70$

$0 = (x+14)(x-5)$

$x = \cancel{-14}, 5$

* can't have a negative side length

x = 5

TOPIC: SIMPLIFYING RADICALS/OPERATIONS ON RADICALS

~Simplify the following radicals.

a) $\sqrt{25} = 5$ b) $\sqrt{36} = 6$ c) $\sqrt{121} = 11$ d) $\sqrt{144} = 12$ e) $\sqrt{289} = 17$

*To simplify the square root of a # that is **NOT** a perfect square, follow these steps:

- Find the biggest perfect square factor of the # under the $\sqrt{\ }$ (biggest # that divides evenly into the # under the radicand).
  List of perfect squares: **1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, …**
- Rewrite the radical as a product of those two numbers that multiply to the # under the $\sqrt{\ }$.
- Simplify (the perfect square under the radicand should turn into a whole #!)

EX) Simplify: $\sqrt{75}$

$\sqrt{25} \cdot \sqrt{3}$

$5\sqrt{3}$

EX) Simplify: $3\sqrt{60}$

$3\sqrt{4} \cdot \sqrt{15}$

$3 \cdot 2\sqrt{15}$

$6\sqrt{15}$

EX) Multiply/Simplify: $3\sqrt{6} \cdot 5\sqrt{3}$

$15\sqrt{18}$ ← simplify!

$15\sqrt{9}\sqrt{2}$

$15 \cdot 3 \rightarrow$

$45\sqrt{2}$

NOTE 1: when multiplying radicals, multiply the integer "coefficients" together, and multiply radicals together. Then simplify if necessary.

NOTE 2: $\sqrt{\#} \cdot \sqrt{\#} = \#$, so for example: $\sqrt{5} \cdot \sqrt{5} = 5$ *This is a helpful trick to multiplying!

15) Multiply and/or simplify the following radicals. Circle your answer.

a) $\sqrt{50}$ $= \sqrt{25}\sqrt{2}$ $\boxed{5\sqrt{2}}$

b) $\sqrt{32}$ $= \sqrt{16}\sqrt{2}$ $= \boxed{4\sqrt{2}}$

c) $2\sqrt{52}$ $2 \cdot \sqrt{4}\sqrt{13}$ $\boxed{4\sqrt{13}}$

d) $\sqrt{40}$ $= \sqrt{4}\sqrt{10}$ $\boxed{2\sqrt{10}}$

e) $3\sqrt{16}$ $3 \cdot 4$ $\boxed{12}$

f) $6\sqrt{63}$ $= 6\sqrt{9}\sqrt{7}$ $= 6 \cdot 3\sqrt{7}$ $\boxed{18\sqrt{7}}$

g) $\sqrt{600}$ $= \sqrt{100}\sqrt{6}$ $\boxed{10\sqrt{6}}$

h) $3\sqrt{6} \cdot 4\sqrt{3}$ $12\sqrt{18}$ $12\sqrt{9}\sqrt{2}$ $12 \cdot 3\sqrt{2}$ $\boxed{36\sqrt{2}}$

i) $5\sqrt{2} \cdot 5\sqrt{2}$ $25 \cdot 2$ $\boxed{50}$

*__When adding and subtracting radicals they must have__ ***__the same radical!__***

* **Just like 2x + 5x = 7x, we can conclude that $2\sqrt{5} + 5\sqrt{5} = \sqrt{5}$.**
* **Similarly, $4\sqrt{3} - 9\sqrt{3} = -5\sqrt{3}$**

EX) Simplify: a) $\sqrt{80} + 4\sqrt{20}$

* First SIMPLIFY EACH TERM! →

$\sqrt{16}\sqrt{5} + 4\sqrt{4}\sqrt{5}$

$4\sqrt{5} + 4 \cdot 2\sqrt{5}$

$4\sqrt{5} + 8\sqrt{5}$

$12\sqrt{5}$

b) $2\sqrt{18} - \sqrt{45} + 2\sqrt{50}$

$\underbrace{2\sqrt{9}}_{2\cdot 3}\sqrt{2} - \sqrt{9}\sqrt{5} + \underbrace{2\sqrt{25}}_{2\cdot 5}\sqrt{2}$

$6\sqrt{2} - 3\sqrt{5} + 10\sqrt{2}$

combine

$16\sqrt{2} - 3\sqrt{5}$

16) Simplify each radical expression.

a) $4\sqrt{10} + 2\sqrt{10}$ $= \boxed{6\sqrt{10}}$

b) $5\sqrt{3} + \sqrt{48}$

$\sqrt{16}\sqrt{3}$

$5\sqrt{3} + 4\sqrt{3} = \boxed{9\sqrt{3}}$

c) $8\sqrt{6} - \sqrt{24}$

$\sqrt{4}\sqrt{6}$

$8\sqrt{6} - 2\sqrt{6} = \boxed{6\sqrt{6}}$

d) $3\sqrt{5} - 2\sqrt{125}$

$-2\sqrt{25}\sqrt{5}$

$3\sqrt{5} - 10\sqrt{5} = \boxed{-7\sqrt{5}}$

$(\sqrt{a})^2 = a$

17) Squaring something means to multiply it by itself. So in order to simplify, rewrite what is being squared twice to start.

a) $(\sqrt{8})^2 = (\sqrt{8})(\sqrt{8}) = \sqrt{64} = \boxed{8}$

b) $(4\sqrt{7})^2 = (4\sqrt{7})(4\sqrt{7})$ $16 \cdot 7 = \boxed{112}$

c) $(3\sqrt{5})^2$ $9 \cdot 5 = \boxed{45}$

What happens when you have a radical in the denominator?
***You can't…. so you Rationalize it!**

What does rationalize mean? you multiply the numerator & denominator by the √ that's in the denominator.

EX) $\frac{7}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \boxed{\frac{7\sqrt{6}}{6}}$

EX) $\frac{15}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{15\sqrt{3}}{3} = \boxed{5\sqrt{3}}$

EX) *Harder type!* $2 \cdot \frac{6}{\sqrt{18}}$ ($\sqrt{9}\sqrt{2}$) $= \frac{\cancel{12}}{\cancel{3}\sqrt{2}} = \frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}}$

18) Rationalize each denominator.

a) $\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{\sqrt{3}}{3}}$

b) $\frac{1}{\sqrt{75}} \cdot \frac{\sqrt{75}}{\sqrt{75}} = \frac{\sqrt{75}}{75} = \frac{5\sqrt{3}}{75}$ simplify $\sqrt{25}\sqrt{3}$ $\boxed{\frac{\sqrt{3}}{15}}$

c) $\frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{10\sqrt{2}}{2} = \boxed{5\sqrt{2}}$

d) $\frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}}$

e) $\frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = \boxed{3\sqrt{2}}$

f) $\frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{\sqrt{15}}{5}}$

TOPIC: SOLVING QUADRATIC EQUATIONS WITH ONLY THE X² TERM!

19) Solve each quadratic equation. Simplify all radicals if necessary.

a. $\sqrt{x^2} = \sqrt{16}$ $\boxed{x = \pm 4}$

b. $2x^2 = 128$ $\frac{2x^2}{2} = \frac{128}{2}$ $\sqrt{x^2} = \sqrt{64}$ $\boxed{x = \pm 8}$

c. $3x^2 = 60$ $\frac{3x^2}{3} = \frac{60}{3}$ $\sqrt{x^2} = \sqrt{20}$ $\sqrt{4}\sqrt{5}$ $\boxed{x = \pm 2\sqrt{5}}$

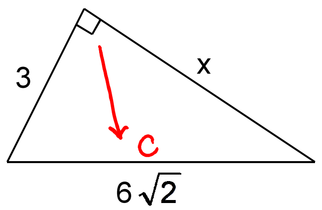
d. $5x^2 = 90$ $\frac{5x^2}{5} = \frac{90}{5}$ $\sqrt{x^2} = \sqrt{18}$ $\sqrt{9}\sqrt{2}$ $\boxed{x = \pm 3\sqrt{2}}$

$a^2 + b^2 = c^2$ → "c" is always the hypotenuse!

GEOMETRY APPLICATION

Find x and the perimeter of each triangle (recall: Pythagorean theorem!). Simplify your answer.

a)



$3^2 + x^2 = (6\sqrt{2})^2$

$36 \cdot 2$

$9 + x^2 = 72$

$-9 \quad -9$

$\sqrt{x^2} = \sqrt{63}$

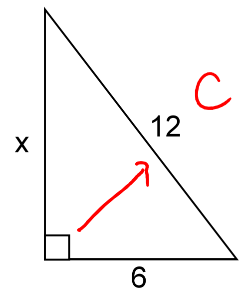
$\sqrt{9}\sqrt{7}$

$x = 3\sqrt{7}$

x = $3\sqrt{7}$ Per = $3 + 3\sqrt{7} + 6\sqrt{2}$ un.

* can't combine

b)



$x^2 + 6^2 = 12^2$

$x^2 + 36 = 144$

$-36 \quad -36$

$\sqrt{x^2} = \sqrt{108}$

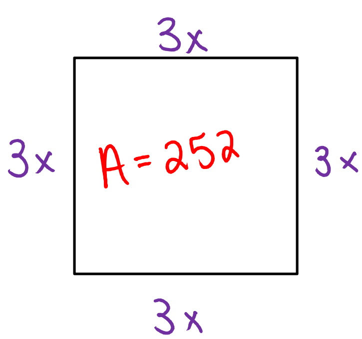
$\sqrt{36}\sqrt{3}$

x = $6\sqrt{3}$ Per = $18 + 6\sqrt{3}$ un.

c) Given the perimeter of the below square is $12x$ inches and its area is $252\ in^2$, solve for x. Simplify your answer.

all sides =

so $\frac{12x}{4} = 3x$



$A_{\square} = l \cdot w$

$252 = 3x(3x)$

$\frac{252}{9} = \frac{9x^2}{9}$

$\sqrt{28} = \sqrt{x^2}$

$\sqrt{4}\sqrt{7}$

$\boxed{x = 2\sqrt{7} \text{ in.}}$