Hawkes Practice: 1/31/20 Friday

1314/0214 College Algebra
Brice
Notes by Nikki Xu
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(1) Determine the missing values in the table based on the equation $x = y^2$

x	0	$\boxed{8}$	64	9	$\boxed{3}$
y	$\boxed{0}$	$2\sqrt{2}$	$\boxed{\pm 8}$	$\boxed{\pm 3}$	$-\sqrt{3}$

① $x=0$, $y=\sqrt{x}=\sqrt{0}=0$

② $y=2\sqrt{2}$, $x=y^2=(2\sqrt{2})^2=8$

③ $x=64$, $y=\sqrt{x}=\sqrt{64}=8$ (or -8)

④ $x=9$, $y=\sqrt{x}=\sqrt{9}=3$ (or -3)

⑤ $y=-\sqrt{3}$, $x=y^2=(-\sqrt{3})^2=3$

Simplifying a radical:

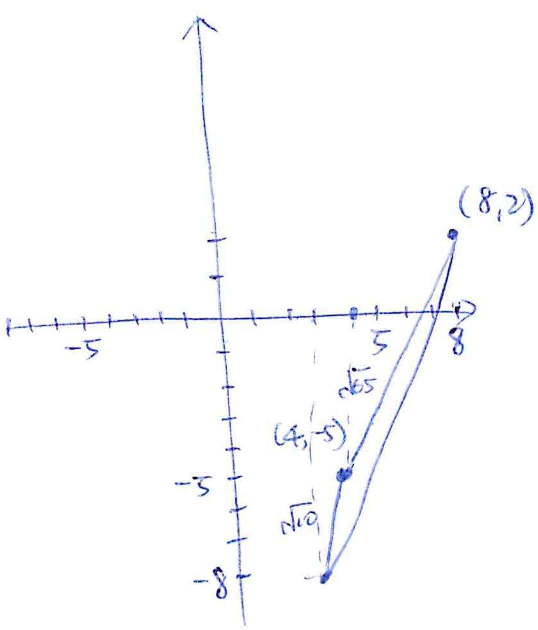
e.g. $\sqrt{125} = \sqrt[2]{5 \cdot 5 \cdot 5} = 5\sqrt{5}$

- prime factoring
- if something shows up twice (2 as the index on $\sqrt{\ }$) then bring it out once.

e.g. $\sqrt{18} = \sqrt{2 \cdot 3 \cdot 3} = 3\sqrt{2}$

(2) Find the perimeter of the triangle whose vertices are the following points specified in the plane.

$(8,2)$; $(4,-5)$ and $(3,-8)$



d_1 between $(8,2)$ and $(4,-5)$

$d_1 = \sqrt{(8-4)^2+(2-(-5))^2} = \sqrt{4^2+7^2} = \sqrt{16+49} = \boxed{\sqrt{65}}$

$= \sqrt{5 \cdot 1\ldots}$

d_2 between $(4,-5)$ and $(3,-8)$

$d_2 = \sqrt{(4-3)^2+(-5-(-8))^2} = \sqrt{1^2+3^2} = \sqrt{1+9} = \boxed{\sqrt{10}}$

$= \sqrt{2 \cdot 5}$

d_3 between $(8,2)$ and $(3,-8)$

$d_3 = \sqrt{(8-3)^2+(2-(-8))^2} = \sqrt{5^2+10^2} = \sqrt{25+100} = \boxed{\sqrt{125}}$

$= \sqrt{5 \cdot 5 \cdot 5}$

The perimeter is the sum of all sides

$P = d_1 + d_2 + d_3 = \sqrt{65} + \sqrt{10} + \sqrt{125} = \sqrt{65} + \sqrt{10} + 5\sqrt{5}$

Q & A : 1/31/20 Friday

Q: How to determine when an absolute value inequality breaks into two ?

A: Depends on the inequality sign.

- If an absolute value is less than (or equal to) ~~some~~ number Then it becomes a string of inequality, where the expression inside the absolute value is sandwiched between the number and its opposite.
- If an absolute value is greater than (or equal to) some number Then break it into Two inequalities, and connect them with an <u>or</u> statement

e.g. ① $|3x-2| < 11$ ☆ abs. val < #

$-11 < 3x-2 < 11$

$-9 < 3x < 13$

$-3 < x < \frac{13}{3}$

$\boxed{\left(-3, \frac{13}{3}\right)}$

② $|3x-2| > 11$ ☆ abs. val > #

$3x-2 > 11$ or $3x-2 < -11$

notice this change of direction!

$3x > 13$ $\quad$ $3x < -9$

$x > \frac{13}{3}$ $\quad$ $x < -3$

$\boxed{(-\infty, -3) \cup \left(\frac{13}{3}, \infty\right)}$