## Warmup 3/(Pythagorean Triple 3, 4, __) <br> Created by Mr. Lischwe

1) Get out your notes sheet from yesterday and finish all the examples we didn't get to yesterday. Work in pairs or as a group if you like. On your warmup, you can just write "notes sheet".

## ALEKS Progress Grade

$$
\begin{aligned}
& +6 \%-100 \\
& +5 \%-90 \\
& +4 \%-80 \\
& +3 \%-70 \\
& +2 \%-60 \\
& +1 \%-50 \\
& +0 \%-0
\end{aligned}
$$

SOME NOTES:

- The knowledge check can bump you up or down. If your progress was a lot higher or lower than you expected, this might be why.
- Any ALEKS you complete between now and Friday can add to your progress grade.
- It is about 4-5 topics for each percent.


## Biggest Gainers:

+7\% Progress:
Kiley F
Dylan $P$
GiGi A
Preston K
Max R
+8\% Progress:
Hannah O
Daniel D
+10\% Progress:
Jadyn G
Zander K

## QUIZ THURSDAY

- Pythagorean Theorem
- Finding the distance between two points
- Pythagorean Theorem Story Problems (drawing pictures \& stuff)

Example 3
What is the distance between $(-3,2)$ and $(4,6)$ ? Draw a picture to help!!!


Example 4

- Can you figure oytwhat the distance would be between (25, (10) and (45) (16)?


$$
\begin{gathered}
20^{2}+6^{2}=d^{2} \\
400+36=d^{2} \\
436=d^{2} \\
d \approx 20.9
\end{gathered}
$$

Example 5

- Find the perimeter of the triangle.
purple: 13

green:

$$
\begin{gathered}
4^{2}+12^{2}=x^{2} \\
16+144=x^{2} \\
160=x^{2} \\
12.6 \approx x
\end{gathered}
$$

blue:

$$
\begin{aligned}
& 9^{2}+12^{2}=x^{2} \\
& (9,12,15)=\text { Triple } \\
& x=15 \\
& =112,6+15 \quad P \approx 40.6
\end{aligned}
$$

$$
\text { Perimeter }=13+12.6+15
$$

## p. 435 (1-4, 9)

1) 3.6 units
2) 4.1 units
3) 7.2 units
4) About 5.1 miles
5) b. Sample answer: Make a right triangle using points B and C, then use the Pythagorean Theorem.
C. $A C \approx 3.6$ units
$A B=5$ units
$A C \approx 4.2$ units
d. 12.8 units

## Geography Application

- This mathematical concept is used to find the distance between cities.

- Nashville has a latitude of about $36.2^{\circ} \mathrm{N}$ and a longitude of about 86.8 W . Memphis has a latitude of about $35.2^{\circ} \mathrm{N}$ and $90.1^{\circ} \mathrm{W}$. Each degree of latitude or longitude is about 60 miles. Based on this information, how far apart are Nashville and Memphis?


$$
3.3^{2}+1^{2}=d^{2}
$$

$$
10.89+1=d^{2}
$$

$$
11.89=d^{2}
$$

$$
d \approx 3.448^{\circ}
$$

$\times 60$ miles per

# Alternate Method: Distance Formula 





- Write this in the blank space on the top right: IF YOU DON'T HAVE A GRAPH:
- Get the horizontal leg by subtracting the x-coordinates
- Get the vertical leg by subtracting the $y$-coordinates
- Then do $a^{2}+b^{2}=c^{2}$

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

When I'm finding the distance, which letter is that?

$$
\sqrt{a^{2}+b^{2}}=c
$$

If " $a$ " is the horizontal distance and " $b$ " is the vertical distance:

$$
\sqrt{(x-x)^{2}+(y-y)^{2}}=c
$$

## Distance Formula

If $\left(x_{1}, y_{1}\right)$ and $\left(x_{2}, y_{2}\right)$ are the points, then:

$$
d=\sqrt{\left(x_{2}-x_{1}\right)^{2}+\left(y_{2}-y_{1}\right)^{2}}
$$

- NOTE: If this formula confuses you, you don't have to use it (at least not this year). You can just draw the triangle and use $a^{2}+b^{2}=c^{2}$ !


## Application - Ladders

- A 15 -foot ladder is propped up against a 15 -foot building. When laid flat against the building, it looks
- If the bottom of the ladder was moved
 OUT 4 feet, what would happen? How far below the top of the building would the ladder go?



## Application: Ladders

1. A 15 -foot ladder is propped up against a 15 foot-tall building. The bottom of the ladder is 4 feet from the building. How high up the building does the ladder reach? Draw a picture and use it to solve!

2. If you want to position the ladder so that tit will exactly reach a window whose windowsill is 2 feet from the top of the building, how far from the building would you have to position the bottom of the ladder?

$x^{2}+13^{2}=15^{2}$

3. CHALLENGE/Early Finisher: How far away from the building does the bottom have to be so that the distance from the ladder to the building is the same as the distance from the ground up to the top of the ladder? (Also, does this seem safe?

## HOMEWORK:

## Story Problems Worksheet

