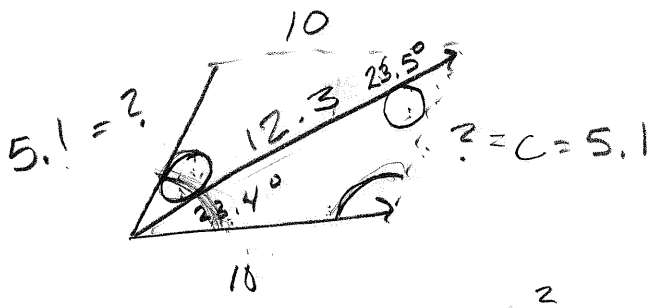
#5 11/26/2012 - Sec 6.1 Math 1060



$$c^2 = 10^2 + 12.3^2 - 2(10)(12.3)\cos 23.4^\circ$$

$$c^2 =$$

$$c = 5.1 \text{ lb}$$

$$10 \cdot \frac{\sin(23.4)}{5.1} = \frac{\sin(\theta)}{10} \cdot 10$$

$$\frac{10\sin(23.4)}{5.1} = \sin\theta$$

$$=$$

$$51.1^\circ = \theta$$

$$51.1 + 23.4 = 74.5^\circ$$

75.2

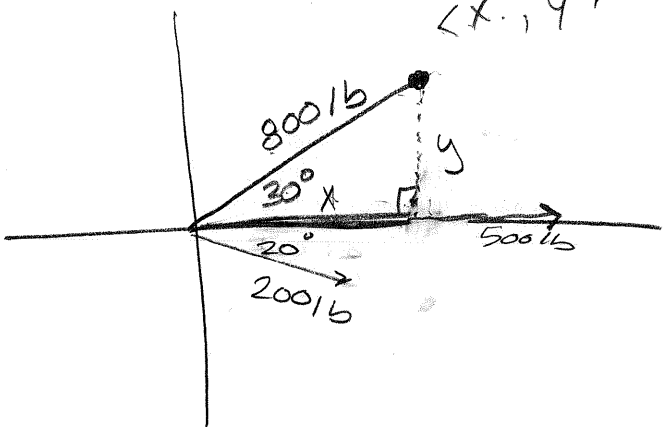
~~74.5°~~, 5.1 lb

#25

$800 \cdot \cos 30$ $\quad$ $800 \sin 30$

$\downarrow \quad \swarrow$

$\langle x, y \rangle$



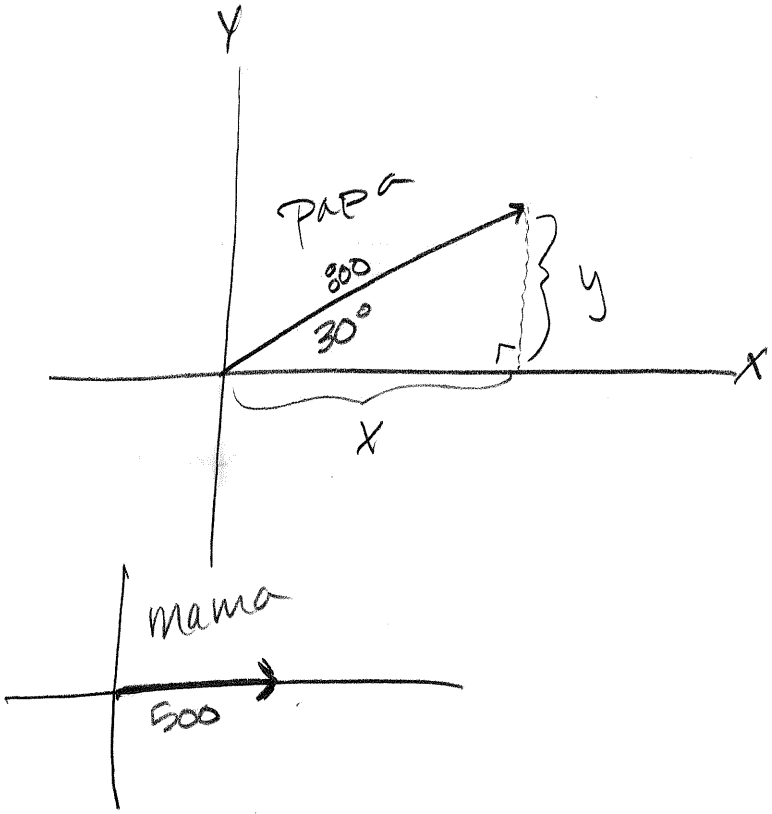
$c^2 = a^2 + b^2$

$\sin 30 = \frac{y}{800}$

$800 \sin 30 = y$

$\cos 30 = \frac{x}{800}$

$800 \cos 30 = x$



Papa Vector

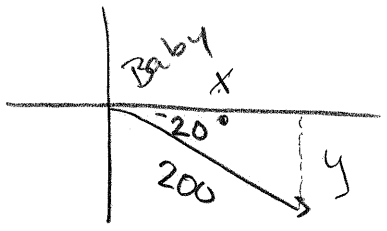
$\langle 692.8203, 400 \rangle$

Mama Vector

$\langle 500, 0 \rangle$

Baby Vector

$\langle 187.9385, -68.4049 \rangle$



$\cos 20 = \frac{x}{200}$

$x = 200 \cos(-20)$

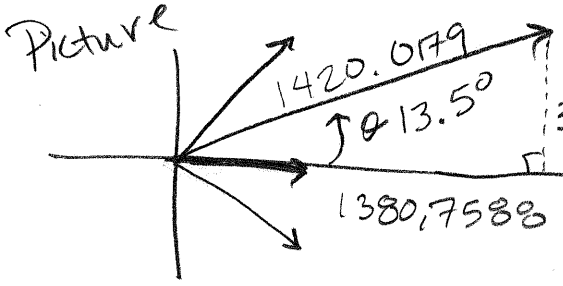
$\sin 20 = \frac{y}{200}$

$y = 200 \sin(-20)$

Resultant

$\langle 1380.7588, 331.5960 \rangle$

$\sqrt{1380.7588^2 + 331.596^2}$

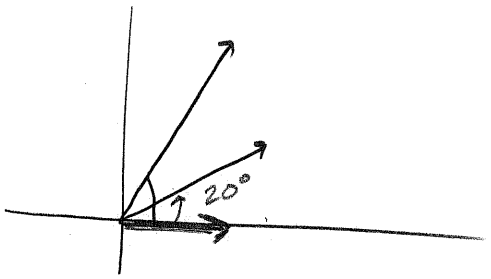


$\tan \theta = \frac{331.5960}{1380.7588}$

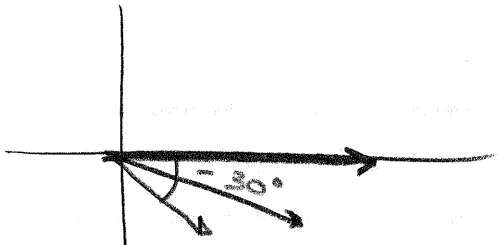
$\theta = 13.5°$

$= \boxed{1420.0179 \text{ lb}}$

$\boxed{E\ 13.5°\ N}$



Baby Elephant on +x-axis



Papa Elephant on + x-axis

Sec 6.1 Complex Numbers

Defn:

The imaginary Number i is defined as $i = \sqrt{-1}$ and $i^2 = -1$

Defn:

The set of Complex Numbers is the set of all Numbers of the form $a+bi$ where a and b are Real Numbers

$a + bi$ ← Standard Form

a → Real part

bi → imaginary part

Notice if $b=0$

then $a+bi = a$ and is

a Real Number

if $b \neq 0$

then $a+bi$ is called

an "imaginary Number"

$\mathbb{N}$ = Natural Numbers

$\{1, 2, 3, \ldots\}$

$\mathbb{W}$ = Whole Numbers

$\{0, 1, 2, 3, \ldots\}$

$\mathbb{Z}$ = Integers

$\{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$

$\mathbb{Q}$ = Rationals

$\left\{\frac{a}{b} \mid a, b \in \mathbb{Z}\right\}$

$\mathbb{R}$ = Reals

{ Rationals ∪ Irrationals }

$\mathbb{C}$ = Complex

$\{a+bi \mid a, b \in \mathbb{R}\}$

2 complex Numbers are equal if and only if their Real and Imaginary parts are equal

$$2+3i = a+bi$$

$$a=2, \quad b=3$$

Operations

1. Add: add Like Parts

Ex: $(2+3i)+(4+5i) = 6+8i$

2. Subtracting: distribute Negative and add

Ex: $(2+3i)-(4+5i)$

$$2+3i-4-5i = -2-2i$$

3. Multiplication: distribute everything (aka foil!)

$(2+3i)(4+5i)$

$$8+10i+12i+15i^2$$

$$8+22i+-15$$

$$-7+22i$$

Powers of i

$i = i$

$i^2 = -1$

$i^3 = -i \leftarrow i^2 \cdot i$

$i^4 = 1$

$i^5 = i$

$i^6 = -1$

$i^7 = -i$

$i^8 = 1$

$i^{257} = i^1 = i$

$4 \overline{)257}$ → 64

24

17

16

1