Slide 1 (Nov 25-10:25 AM)

Net Force

Forces are measured in Newtons (N)

Net force / unbalanced force - total of all forces.

Slide 2 (Nov 9-3:20 PM)

Description of Motion	Net Force: Yes or No?
·········· · · · · · ·₀🚗	See Answer
· · · · · · · · · ·₀🚗	See Answer
· · · · · · · · ·₀🚗	See Answer
Velocity vs Time (flat line)	See Answer
Velocity vs Time (decreasing line)	See Answer
Velocity vs Time (increasing line)	See Answer

Force Components (Dec 3-10:39 AM)

Thus far, forces have co-operated by being either co-linear (same line) or perpendicular (right angles).

To find Fnet when forces are at some angle, we need to turn them into "x" and "y" components using trig.

This is called "resolving the force into components"

Slide 4 (Nov 26-1:22 PM)

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Slide 5 (Dec 3-10:50 AM)

Ex: A force of 500 N is directed at an angle of 40° below the horizontal.
Determine the components.

SOH CAH TOA

$F_x = 383N$

$\cos 40 = \dfrac{F_x}{500}$

$(\cos 40)(500) = F_x$

$383 N = F_x$

$\sin 40 = \dfrac{F_y}{500}$

$\sin 40 (500) = F_x$

$321 N = F_y$

40°   500N F_y 321N

Slide 6 (Dec 3-11:00 AM)

Ex 1: Calculate the net force acting on the mass below.

* we cannot add forces which are at angles
* we must resolve these forces into components
* use a table to keep your work organized

$F_2 = 550$ N, $F_1 = 220$ N, 2.0 kg, 42°, $F_3 = 550$ N

$\cos 42 = \dfrac{F_x}{550}$

	x	y
F_1	− 220	0
F_2	550 cos 42 408.73	550 sin 42 368.02
F_3	550 cos 42 408.73	550 sin 42 − 368.02
Fnet	597.46	0

$F_{net} = 597.46 \, N \, [R]$

1

Example 2

$F_2 = 550$ N $F_3 = 675$ N

$F_1 = 220$ N

$F_{net}^2 = 526.23^2 + 216.55^2$
$F_{net} = 569.04$ N

526.23

$\tan\theta = \dfrac{526.23}{216.55}$

F_{net}

θ

216.55 N

$\theta = 67.63°$

$\vec{F_{net}} = 569.04$ N
$[67.63° N \, of \, E]$

	x	y
F_1	O	− 220
F_2	550 sin42 −368.02	550 cos42 408.73
F_3	675 sin60 584.57	675 cos60 337.5
F_{net}	216.55	526.23

Dec 3-2:13 PM

Jerome and Michael, linebackers for South's varsity football team, delivered a big hit to the halfback in last weekend's game.
Striking the halfback simultaneously from different directions with the following forces. What was the net force?

$F_{Jerome} = 1230$ N at 53° Nof W
$F_{Michael} = 1450$ N at 17° S of W

1230N

1450N

2198.95N
[75.29° Woof N]

	x	y
F_J	1230 cos 53 −740.23	1230 sin53 982.32
F_M	1450 cos 17 −1386.64	1450 sin 17 −423.94
F_{net}	−2126.87	558.38

Nov 15-1:49 PM

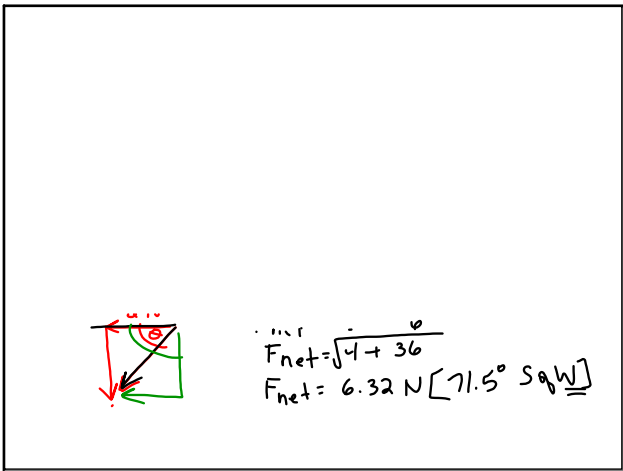
A pack of three Arctic wolves are fighting over the carcass of a dead polar bear.
A top view of the magnitude and direction of the three forces is shown in the diagram to the right.
Determine the resultant or net force acting upon the carcass.

① 600 N, 45°

45° F_y

250 N, west ② F_x

Top View

500 N, south ③

	F_x	F_y
F_1	600 cos45 424.26	600 sin45 424.26
F_2	− 250	O
F_3	O	− 500
F_{net}	174.26	− 75.74

174.26

θ

F_{net}

75.74

$\vec{F_{net}} = 190$ N $[23° S \, of \, E]$

Oct 3-1:00 PM

Hmwk: Worksheet

Dec 3-11:28 AM

Find $\vec{F_{net}}$

191.51N F_x 110 N

160.7 (40°)

F_y 250N

$F_x \rightarrow 110 + (−191.51)$
$= − 81.51$ N
$F_y = −160.7$ N

81.51N

θ

160.7 F_{net}

$\dfrac{F_x}{}$
$\cos40 = \dfrac{F_x}{250}$
$250 \cos40 = F_x$
191.51 N $= F_x$

$\dfrac{F_y}{}$
$\sin40 = \dfrac{F_y}{250}$
$250 \sin40 = F_y$
$160.70 = F_y$

$F_{net}^2 = 81.51^2 + 160.7^2$
$F_{net} = 180.15$ N $[63° S \, of \, W]$
$\tan\theta = \dfrac{160.7}{81.51}$
$\theta = 63°$

Nov 25-10:30 AM

A pack of three Arctic wolves are fighting over the carcass of a dead polar bear.
A top view of the magnitude and direction of the three forces is shown in the diagram to the right.
Determine the resultant or net force acting upon the carcass.

600 N, 45°

45°

250 N, west

Top View

500 N, south

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33 Draw the FBD
#36 a, b,c,e,g,h
#44 Find the Net Force

Nov 25-10:33 AM

$$F_{net} = \sqrt{4 + 36}$$
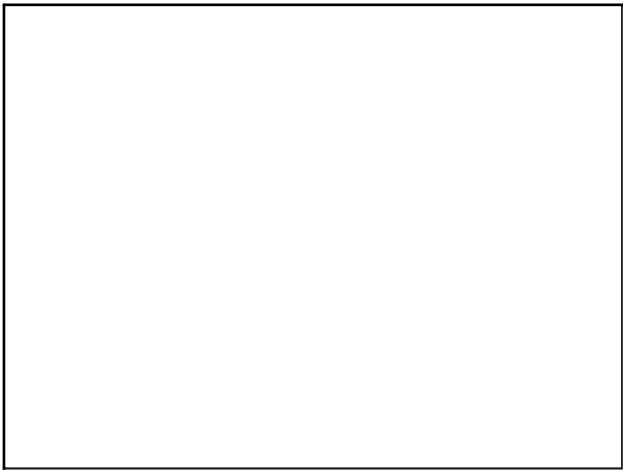
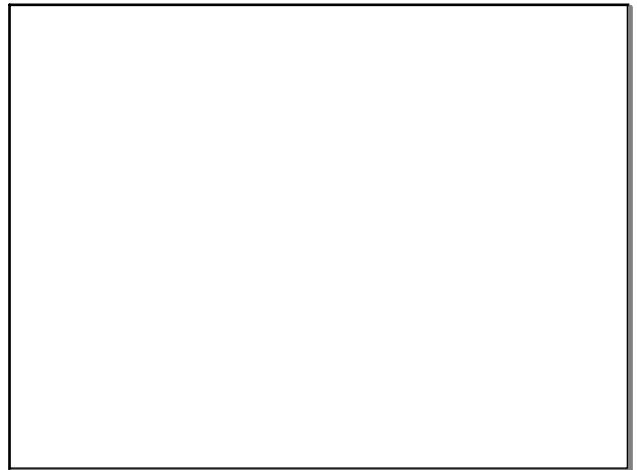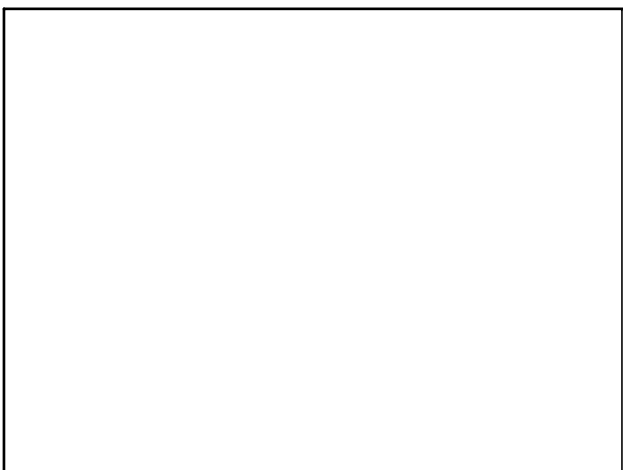$$F_{net} = 6.32 \, N \, [71.5° \, S_{\theta}W]$$

Nov 25-10:34 AM

Nov 25-10:54 AM

Nov 26-1:37 PM

Nov 26-1:42 PM

Nov 26-1:56 PM