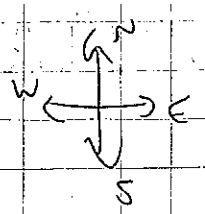
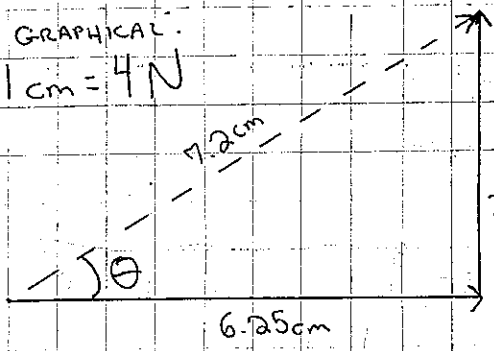
2D Force Vectors Solutions



1) GRAPHICAL:

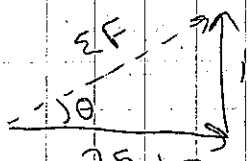
1 cm = 4 N



$\Sigma F = 7.2\text{cm} \times \frac{4\text{N}}{\text{cm}} = 29\text{N}$

$\theta = 31.0°$

MATHEMATICAL:



$\Sigma F = \sqrt{(25\text{N})^2 + (15\text{N})^2}$

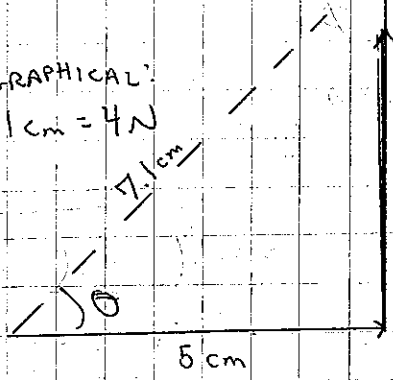
$= 29.2\text{N}$

$\theta = \tan^{-1}\left(\frac{15\text{N}}{25\text{N}}\right)$

$= 31.0°$ NORTH OF EAST

2) GRAPHICAL:

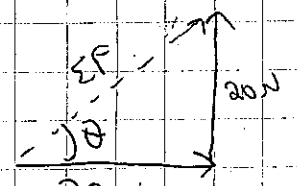
1 cm = 4 N



$\Sigma F = 28\text{N}$

$\theta = 45.0°$

MATHEMATICAL:



$\Sigma F = \sqrt{(20\text{N})^2 + (20\text{N})^2}$

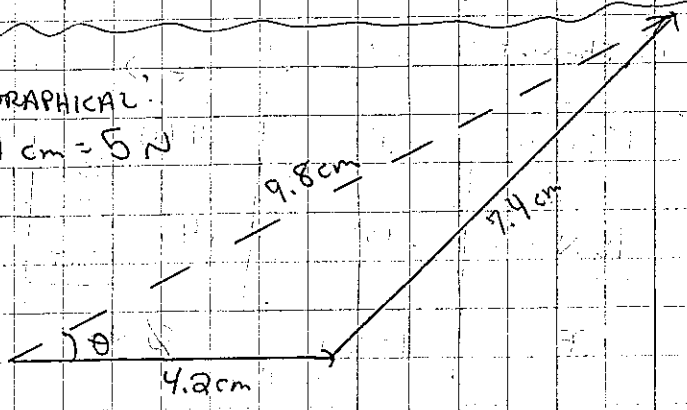
$= 28.3\text{N}$

$\theta = \tan^{-1}\left(\frac{20\text{N}}{20\text{N}}\right)$

$= 45°$

3) GRAPHICAL:

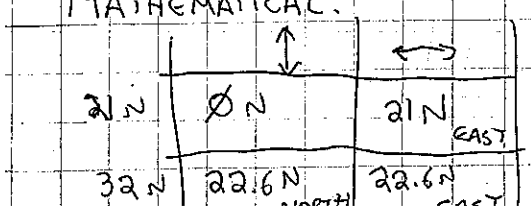
1 cm = 5 N

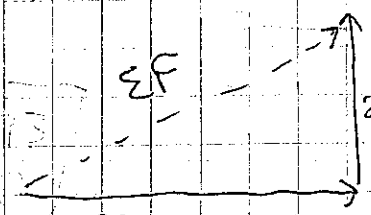


$\Sigma F = 49\text{N}$

$\theta = 27.4°$

MATHEMATICAL:





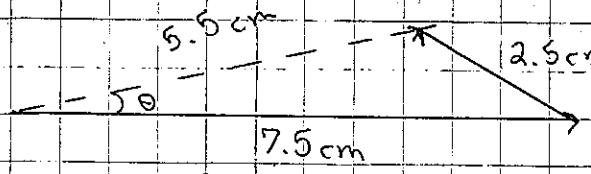
$\Sigma F = \sqrt{(21\text{N} + 22.6\text{N})^2 + (22.6\text{N})^2}$

$= 49.1\text{N}$

$\theta = \tan^{-1}\left(\frac{22.6\text{N}}{21\text{N} + 22.6\text{N}}\right)$

$= 27.4°$

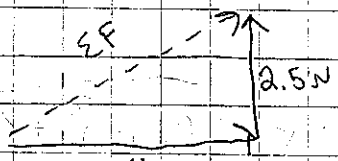
4) GRAPHICAL:
1 cm = 2 N



$\Sigma F = 11\ N$
$\theta = 14.0^\circ$

MATHEMATICAL:

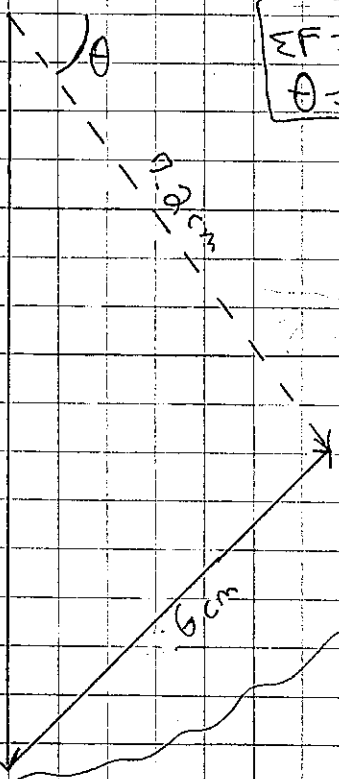
	↕	↔
15 N	$\emptyset$ N	15 N EAST
5 N	2.5 N NORTH	4.33 N WEST



$\Sigma F = \sqrt{(15N - 4.33N)^2 + (2.5N)^2}$
$= 11.0N$

$\theta = \tan^{-1}\left(\frac{2.5N}{15N - 4.33N}\right)$
$= 13.2^\circ$

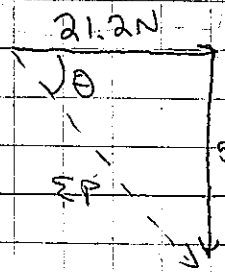
5) GRAPHICAL:
1 cm = 5 N



$\Sigma F = 36\ N$
$\theta = 53.5^\circ$

MATHEMATICAL:

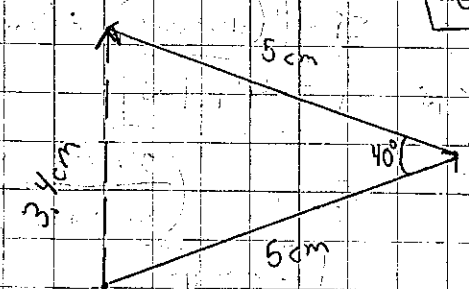
	↕	↔
50 N	50 N SOUTH	$\emptyset$ N
30 N	21.2 N NORTH	21.2 N EAST



$\Sigma F = \sqrt{(21.2N)^2 + (50N - 21.2N)^2}$
$= 35.8\ N$

$\theta = \tan^{-1}\left(\frac{50N - 21.2N}{21.2N}\right)$
$= 53.6^\circ$

6) GRAPHICAL:
1 cm = 3 N



$\Sigma F = 10.N$
$\theta =$ NORTH

MATHEMATICAL:

	↕	↔
15N NE	5.13N NORTH	14.1N EAST
15N NW	5.13N NORTH	14.1N WEST
ΣF	10.3N NORTH	$\emptyset$ N

$\Sigma F = 10.3N$
$\theta =$ NORTH