Do Now

Given that a car's speed is:

t(s)	0	1	2	3	4	5
v(m/s)	10	13	16	19	22	25

v_i v_f 17.5 m/s

What's the average speed? 17.5 m/s

$\bar{v} = \frac{v_i + v_f}{2}$

How far did it travel?

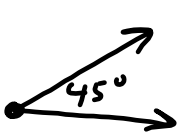
$d = ?$ $\bar{v} = \frac{d}{t}$

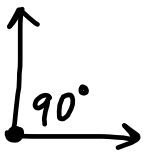
$d = \bar{v}t = (17.5\ m/s)(5\ s) = 87.5\ m$

3) Min (180°) A - B

Max (0°) A + B

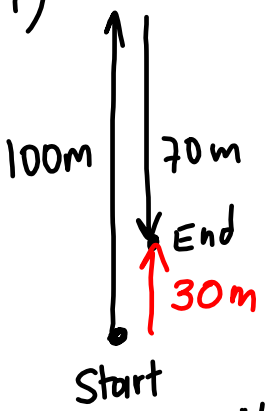
5)



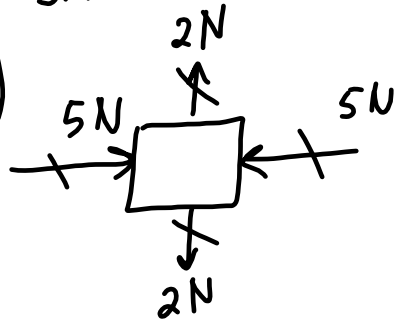


θ ↑, R ↓

7)



9)



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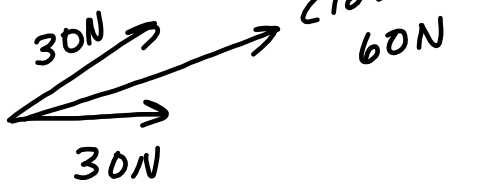
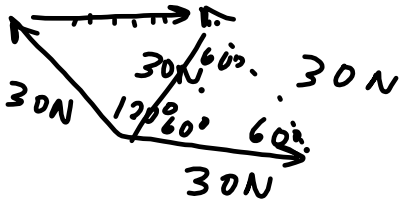
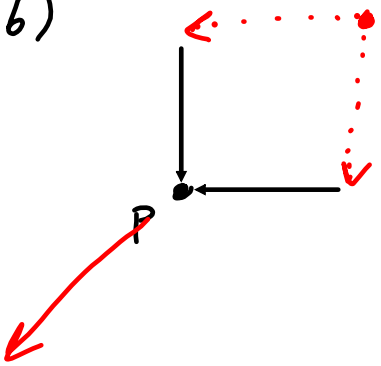
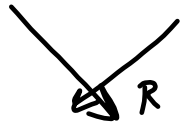




13)

16)





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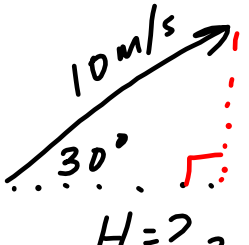

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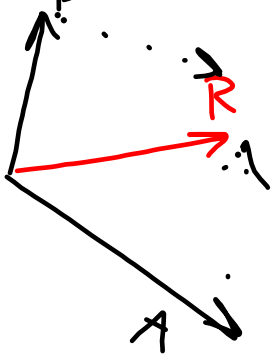

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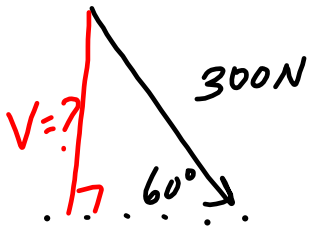


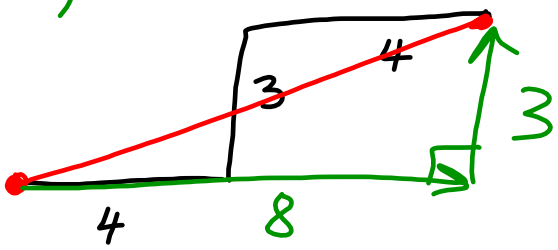
23) 100N 25N

~~0~~ ~~50~~ 100 ~~150~~

Max 125

Min 75

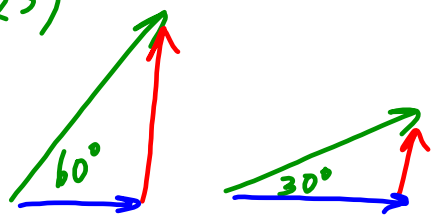
24)



Distance : 11

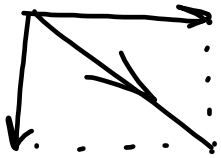
Displacement 9. . . .

25)



$\theta\downarrow, V\downarrow, H\uparrow$

Follow directions



units.

Back to our car...

t(s)	0	1	2	3	4	5
v(m/s)	10	13	16	19	22	25

Notice: V changes gradually every second

v(m/s)	10	13	16	19	22	25
		+3	+3	+3	+3	+3

This quantity has a special name...

ACCELERATION

ACCELERATION

Acceleration indicates how the velocity changes every second:

Ex:

A car travels at 10 m/s and accelerates at 2 m/s every second.

Write the car's velocity for the following 5 seconds.

10 m/s, 12 m/s, 14, 16, 18, 20

What is the acceleration?

v(m/s) = 3, 7, 11, 15, 19, ...

4 4 4 4

$a = 4\ m/s/s = 4\ m/s^2$

$$\frac{\frac{m}{s}}{\frac{s}{1}} = \frac{m}{s} \cdot \frac{1}{s} = \frac{m}{s^2}$$

What is the acceleration?

v(m/s) = 100, 104, 108, 112, ...

4 4 4

$a = 4\ m/s^2$

What is the acceleration?

v(m/s) = 20, 18, 16, 14, ...

$a = -2\ m/s^2$

Write v for the next 4s

$a = 1 m/s^2$

v(m/s) = 3, 4, 5, 6, 7

Write v for the next 4s

$a = 5 m/s^2$

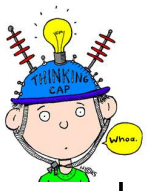
v(m/s) = 0, 5, 10, 15, 20

Write v for the next 4s

$a = -3 m/s^2$

v(m/s) = 25, 22, 19, 16, 13

A car accelerates from 20m/s to 27m/s in 5s. What is its acceleration?



Equation #1: Constant acceleration

$a = \frac{\Delta v}{t}$ Δv = change in velocity Units?

t = time Units?

$a = \frac{v_f - v_i}{t}$ a = acceleration Units?

V = 20 21.4 22.8 24.2 27

$a = \frac{\Delta v}{t}$

$a = \frac{27 m/s - 20 m/s}{5 s}$

$a = 1.4 m/s^2$