Topic 1B: Intro to Vectors and 1D Motion
Skills 4-6

9. Label each of the following as either a vector or scalar quantity.

a) 10m scalar

b) 20m up vector

c) 40m left vector

d) 50mm right vector

e) 15mm scalar

f) 20 m left vector

10. Determine the distance and displacement for each the following scenarios:

a) A student walks 50m north and 30m south
Distance: 80m

Displacement: 20 north

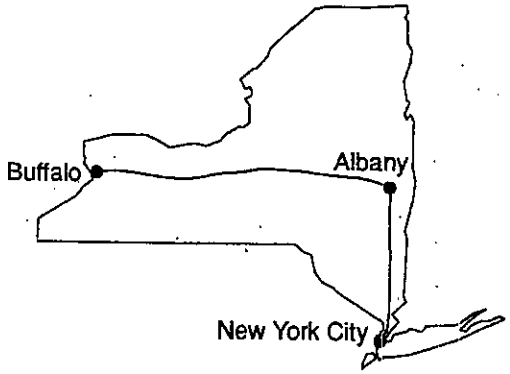
b) An ant travels 15m east and 20 m west
Distance: 35 m

Displacement: 5m west

c) A wind up toy travels 30cm east, 20 cm west
Distance: 50 cm

Displacement: 10cm east

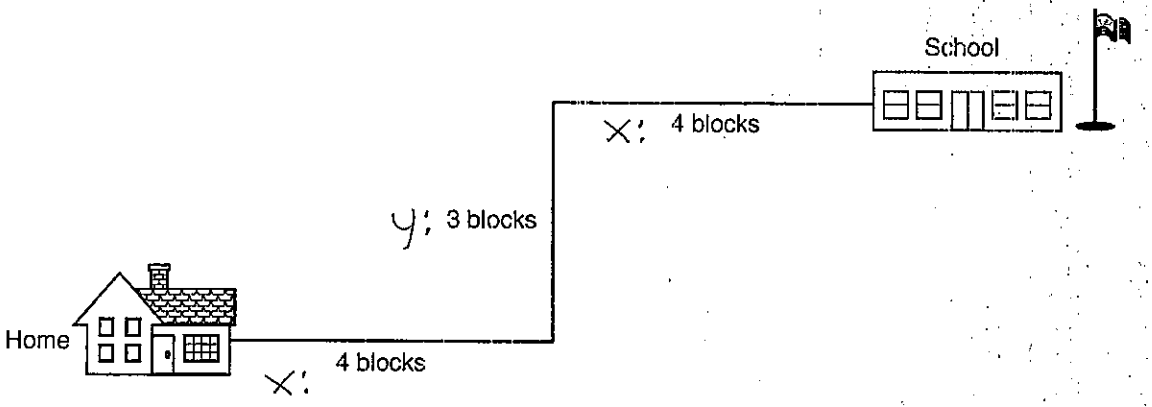
11. A car is driven from Buffalo to Albany and on to New York City, as shown in the diagram below.



Compared to the magnitude of the car's total displacement, the distance driven is

A) shorter
B) longer
C) the same

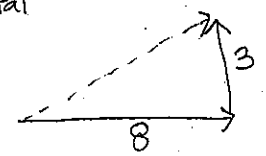
12. A student on her way to school walks four blocks east, three blocks north, and another four blocks east, as shown in the diagram.



Determine the magnitude of the resultant displacement

A) 8.5 blocks
B) 11 blocks
C) 20.5 blocks
D) 5 blocks

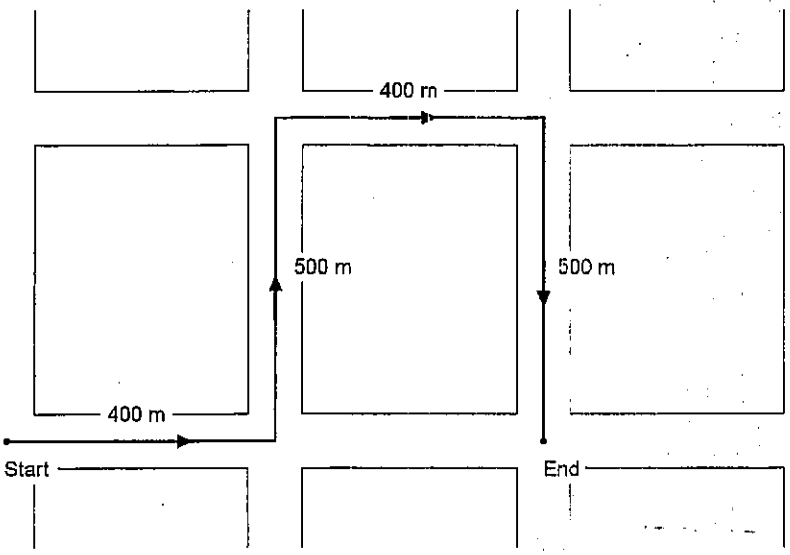
$\Sigma x = 8$ blocks
$\Sigma y = 3$ blocks
total



$R^2 = R_x^2 + R_y^2$
$R^2 = (8b)^2 + (3b)^2$
$R = \sqrt{64b^2 + 9b^2}$
$R = 8.5$ blocks

"R must be less than sum and greater than difference" greater than the longest side

13. The map below shows the route traveled by a school bus.



Compared to the magnitude of the displacement, the distance traveled is

A) $4x10^{-1}$ km greater
B) $4x10^{-1}$ km less
C) 1 km less
D) 1 km greater

distance	displacement
400m	$\Sigma x = 800m$
500m	$\Sigma y = 0$
400m	
500m	$\Sigma R = 800m$
1800m	

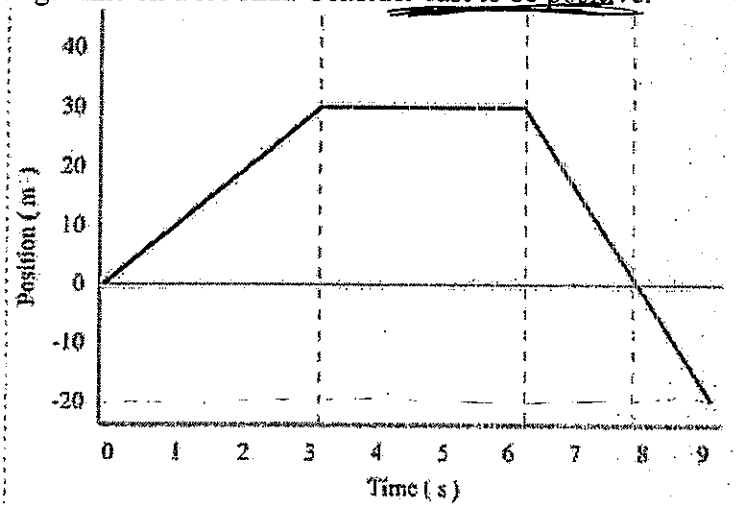
compared to 800m, 1800m is 1000m more ↓ 1km

14. A student walks 40 meters south and 15 meters north. What is the student's total displacement?

A) 25m south
B) 25m north
C) 55m north
D) 55 m south

x	y
	−40m
	+15m
	−25m

15. The graph below represents the motion of an ice skater as they move back and forth on a straight line on a ice rink. Consider east to be positive.



From 0 to 9 seconds what is the total displacement of the ice skater?

A) 20 meters west
B) 20 meters east
C) 30 meters east
D) 80 meters west

16. Which two terms represent a vector quantity and the scalar quantity of the vector's magnitude, respectively?

includes direction

no direction

A) acceleration and velocity
B) weight and force
C) speed and time
D) displacement and distance
Vector Scalar

17. A girl leaves a history classroom and walks 10. meters north to a drinking fountain. Then she turns and walks 30. meters south to an art classroom. What is the girl's total displacement from the history classroom to the art classroom?

A) 20. m south
B) 20. m north
C) 40. m south
D) 40. m north