

**Knowledge – 10M**Multiple Choice      Select the *best* answer.

1. A skateboarder travels 17.5 m down a hallway in a total time of 3.4 s. What is the boarder's average speed?
  - a. 0.2 m/s.
  - b. 0.19 m/s
  - c. 5.1 m/s
  - d. 5.15 m/s
  - e. Not enough information.
  
3. Select the scalar?
  - a. acceleration
  - b. displacement
  - c. gravity
  - d. time
  - e. velocity
  
4. A runner runs around a 400m oval track, finishing where he started. Which of the following statements is true?
  - a. their velocity equals their speed.
  - b. their displacement equals their distance travelled.
  - c. their distance travelled is 0.
  - d. their displacement is 0.
  - e. their velocity is not 0.
  
5.  $6.732\text{mm}^2$ , converted to  $\text{m}^2$ , would equal what?
  - a.  $6.732 \times 10^{-12}\text{m}^2$
  - b.  $6.732 \times 10^{12}\text{m}^2$
  - c.  $6.732 \times 10^{-6}\text{m}^2$
  - d.  $6.732 \times 10^6\text{m}^2$
  - e. none of a, b, c or d.

6. An object with an initial speed of 0.50 m/s accelerates at  $1.5 \text{ m/s}^2$  for 2.00 s. What is its final speed?

- a. 1.5 m/s.
- b. 3.0 m/s.
- c. 4.0 m/s.
- d. 2.8 m/s.
- e. 3.5 m/s.

7. An object starts from rest and travels 8.0 m with an acceleration of  $4.0 \text{ m/s}^2$ . What is its final speed?

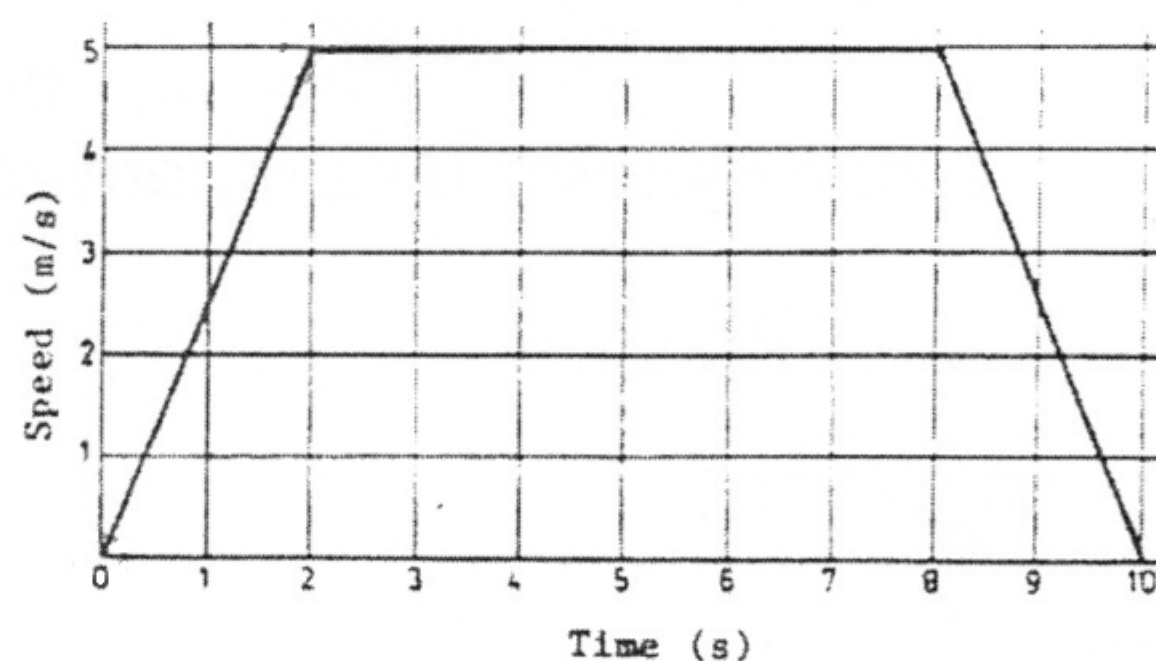
- a. 32 m/s
- b. 2.0 m/s
- c. 64 m/s
- d. 8.0 m/s
- e. 16 m/s

8. A boat sails at  $10.0 \text{ km/h}$  [S  $60^\circ$ W]. What is its component in the south/north axis?

- a. 8.7 km/h
- b. 5.00 km/h
- c. 5.30 km/h
- d. 10.0 km/h
- e. none of the above a. to d.

9. An elevator moves from the basement to the tenth floor of a building, and is shown in the speed time graph below. The acceleration of the elevator during the first 2 seconds is

- a.  $10 \text{ m/s}^2$
- b.  $5.0 \text{ m/s}^2$
- c.  $2.5 \text{ m/s}^2$
- d.  $2.0 \text{ m/s}^2$
- e.  $0 \text{ m/s}^2$



10. Which of the following situations will result in non-zero acceleration?

- a. an object speeds up.
- b. an object slows down.
- c. an object in motion changes direction.
- d. All of the above.
- e. None of the above.

*Note: 3 communication marks are assigned for applying significant digits, SI units, and writing clear and logical solutions.*

## APPLICATION – 14M

1. Do the following metric conversions. (Show all work in the space below.)

a)  $3490 \text{ Mg} = \underline{\hspace{2cm}} \text{ mg}$

b)  $6.12 \times 10^4 \mu\text{m}^2 = \underline{\hspace{2cm}} \text{ km}^2$

/2

2. Do the following calculations based on the measurements given.  
Use care, paying attention to sig. figures and accuracy for the answer.

a)  $0.0146 \text{ km} + 3.87 \text{ m} + 4264.5 \text{ mm}$

/1

3. A motorcyclist on the highway travelling at  $30.0 \text{ m/s [W]}$ , wants to slow down to  $15 \text{ m/s [W]}$  so that they can merge onto an exit ramp. They step on the brakes and accelerates at a constant rate of  $4.21 \text{ m/s}^2 \text{ [E]}$ .

a) How much time does he take to merge onto the exit ramp?

/1

b) What is the displacement of the motorcycle during the merge onto the exit ramp?

/1

4. What is the acceleration of a car that travels due north at a constant speed of 75 km/h for 6.5 s?

/1

5. Given two vectors  $A = 7.0 \text{ m [E]}$ ,  $B = 15.0 \text{ m [N]}$ ,

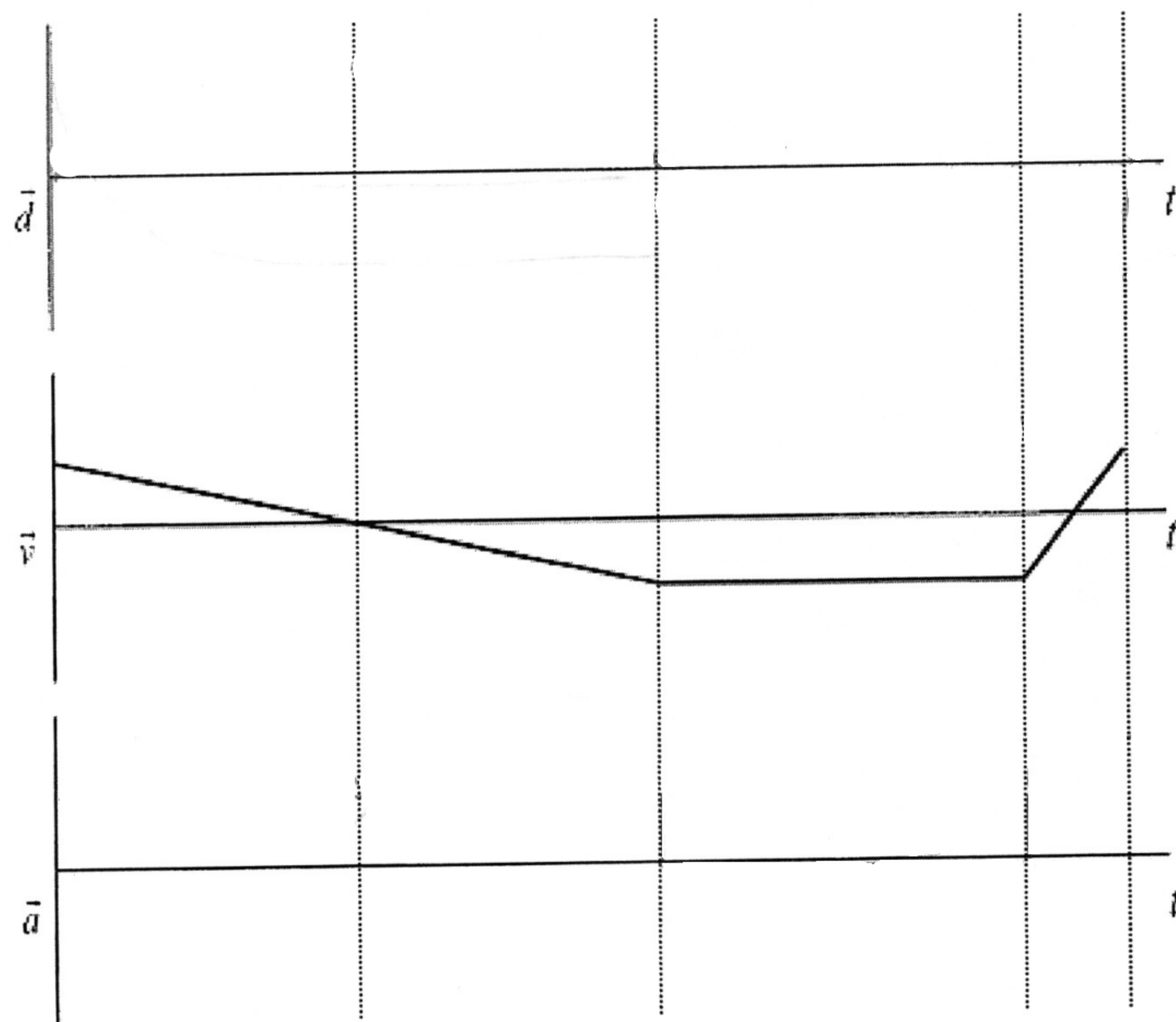
What is  $A + B$ ?

/2

(Note: communication mark expects neat, clearly labeled vector diagram.)

6. For the following velocity-time graph, sketch the corresponding displacement-time graph and the corresponding acceleration-time graph.

/6





## THINKING – 8M

7. A person is being pursued by the police. First they run 35m [N 25° W], then they run 25m [E 40° N], and then 12m [E 25° S]. Assuming the police started at the same point, what would be their straight-line displacement be to end up at the same place?  
(Note: Include a neat, clearly labeled diagram with vectors. Show steps.)

/4

8. A tennis ball moving at 20.0 m/s [N 45° W] hits a wall and rebounds at 5.0 m/s [S 45° W]. Find the change in velocity of the tennis ball.

/4

(Note: Include a neat, clearly labeled diagram with vectors. Show steps.)