

- 1) In 1979, Bryan Allen pedaled the Gossamer Albatross aircraft 35 km across the English Channel in a time of 169 min (3 hrs)
 - a) calculate the average speed of the aircraft (2 marks)
 - b) During his famous flight, Allen had to battle a headwind that slowed him down. With no wind, he is capable of pedaling at a constant rate to keep the plane flying at 19 km/h. How long would the crossing have taken flying at 19 km/h? (4 marks)
- 2) Dmitri has three alternative means of getting to school: taking the bus, catching a ride in his friend's car, or riding his bike. Each mode of transportation follows a slightly different route from Dmitri's house to his school. The bus travels a distance of 7.5 km at an average speed of 18 km/h; the car travels 6.0 km at 24 km/h, and the bike travels 5.6 km at 16 km/h. Calculate the time each alternative takes. (12 marks)
- 3) Cell phone technology has developed to the point that good quality units are readily available and affordable.
 - a) What is a significant benefit of having a cell phone in a vehicle? (1 mark)
 - b) What are 3 risks created when someone uses a cell phone while driving? (3 marks)
 - c) It takes about 5.0 s to dial a number on a cell phone. How far would a vehicle travel while the number is being dialed, if the vehicle is moving at a constant speed of 60 km/h? (4 marks)
 - d) Name one thing you can do to reduce the risks when cell phones are used in vehicles (1 mark)
- 4) A motorboat accelerates from rest to a final speed of 6.0 m/s in a time of 3.0 s. What is the average acceleration of the motorboat? (4 marks)
- 5) A car is struck from behind by a large truck. The impact lasts 0.10 s and causes an acceleration of 45 m/s^2 of the car. What is the car's change in speed? (4 marks)
- 6) While pulling a barge, a tugboat accelerates at 0.10 m/s^2 to produce a 5.0 m/s change in speed of the barge. How long did this take? (4 marks)
- 7) A flea may have the world record for high jumping if relative size is taken into account. A flea can jump an amazing 130 times its own height. This feat is achieved by a phenomenal acceleration of about 1.5 km/s^2 , but over a very short time of 1.0 ms. What is the final speed of the flea at the end of 1.0 ms? (4 marks)
- 8) A bottle-nosed dolphin is cruising along and then accelerates at 0.50 m/s^2 to reach a final speed of 9.7 m/s after 15 s. What was the initial speed of the dolphin? (4 marks)
- 9) While drag racing out of our school parking lot, I time myself at a speed of 40 meters per second seven seconds after starting.
 - a) What was my acceleration during this time? (2)

b) Using this information, how far have I gone during this seven seconds? (2)

If I were to accelerate at this rate for another ninety seconds, how fast would I be going? (2)

10) The space shuttle Endeavor is launched to altitude of 500,000 m above the surface of the earth. The shuttle travels at an average rate of 700 m/s. How long will it take for Endeavor to reach its orbit? (2)

11) A car is driving 33.3 m/s down the highway when the driver sees a deer standing still on the highway 250 m in front of her. She slams on the brakes and decelerates at a rate of 10 m/s^2 . Does she hit the deer? (5)

Part C: Graphing

1) Using your graphing skills, complete a graph for the following table. ENSURE THAT YOU SHOW THE SCALE FOR **ONE SQUARE** ON EACH OF YOUR AXIS. (9 marks)

| | | | | | |
|----------------|----|----|----|----|----|
| Velocity (m/s) | 12 | 24 | 36 | 48 | 60 |
| Time (s) | 2 | 4 | 6 | 8 | 10 |

2) On the graph complete the following questions

a) Is the shape of your line linear or curved? Is your slope positive or negative? (2 marks)

b) Determine slope. (2 marks)

c) Find the area between 4 seconds and 8 seconds. Determine what value you are finding when you calculate area on this graph. (3 marks)

3) Graph the following data in the space provided. (5)

| Velocity (m/s) | Time (s) | Velocity (m/s) | Time (s) |
|----------------|----------|----------------|----------|
| 15 | 1 | 35 | 9 |
| 20 | 3 | 40 | 11 |
| 26 | 5 | 45 | 13 |
| 29 | 7 | 50 | 15 |