

Q1. (2018)

0 6

Figure 10 shows a lorry.

Figure 10



a)

0 6 . 1

The brakes of the lorry are in a poor condition.

What effect will the condition of the brakes have on thinking distance and the braking distance of the lorry?

[2 marks]

Thinking distance _____

Braking distance _____

b)

0 6 . 2

Using a hand-held mobile phone while driving is illegal in the United Kingdom.

Table 1 shows the effect of using a mobile phone on thinking distance.

Table 1

	Thinking distance
Not using a mobile phone	19 m
Using a mobile phone with hands-free kit	23 m
Using a hand-held mobile phone	27 m

Explain why driving while using a hand-held mobile phone is more dangerous than using a mobile phone with a hands-free kit.

Use data from Table 1

[4 marks]

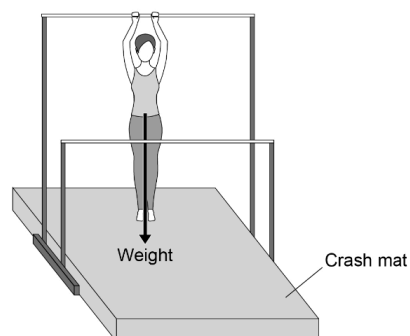
Q2. (2019)

0 2

Figure 3 shows a gymnast on a piece of gymnastic equipment.

The equipment consists of two bars at different heights.

Figure 3



- 0 2 . 6 Falling on the crash mat reduces the average deceleration of the gymnast compared with falling on a hard surface.

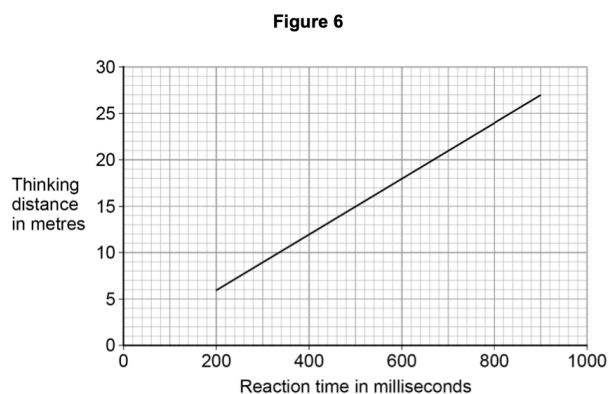
Explain why reducing the deceleration is important to the gymnast.

[2 marks]

Q3. (2019)

- 0 4 The thinking distance of a car depends on the reaction time of the driver.

Figure 6 shows how thinking distance varies with reaction time for a car travelling at 30 m/s



a)

- 0 4 . 1 The reaction time of a driver can double if the driver is distracted.

Explain the effect doubling the reaction time has on the thinking distance.

Use data from **Figure 6**.

[2 marks]

b)

- 0 4 . 2 Give the reason why there are no values of thinking distance for reaction times less than 200 milliseconds.

[1 mark]

Q4. (2019)

A driver measured her reaction time using an online test. She did the test five times.

Table 2 shows the results.

Reaction time in milliseconds				
258	265	302	248	327

a)

- 0 4 . 4 Calculate the mean reaction time of the driver.

[2 marks]

b)

0 4 . 5 The driver is driving her car at 30 m/s

Determine the thinking distance.

Use **Figure 6** and your answer from Question **04.4**

[1 mark]

Thinking distance = _____ m

c)

0 4 . 6 The driver applies the brakes and the car comes to a stop.

The force exerted by the brakes affects the braking distance.

Give **two** other factors that affect the braking distance.

[2 marks]

1 _____

2 _____

Q5. (2021)

0 3 The stopping distance of a car is the sum of the thinking distance and the braking distance.

0 3 . 1 The thinking distance is affected by the reaction time of the driver.

Which **two** of the following can affect the reaction time of the driver?

[2 marks]

Tick (✓) **two** boxes.

Damaged brakes ☐

Taking drugs ☐

Tiredness ☐

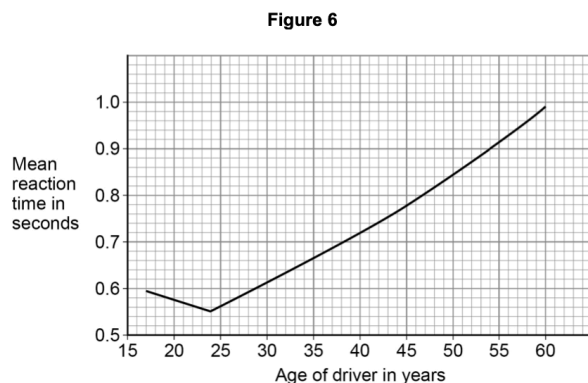
Wet roads ☐

Worn tyres ☐

Q6. (2021)

Scientists measured the reaction time for drivers of different ages.

Figure 6 shows the results.



a)

0 3 . 2 At what age did the drivers have the lowest mean reaction time?

[1 mark]

Age = _____ years

b)

0 3 . 3 What was the lowest mean reaction time?

[1 mark]

Time = _____ seconds

Q7. (2021)

0 3 . 5 A car is travelling at a speed of 12 m/s.

The driver applies the brakes and the car decelerates at a constant 3.0 m/s².

Calculate the braking distance of the car.

Use the equation:

$$\text{braking distance} = \frac{(\text{speed})^2}{2 \times \text{deceleration}}$$

Choose the unit from the box.

[3 marks]

m	kg	s
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Braking distance = _____ Unit _____

Q8. (2021)

0 3 . 6 To pass the UK driving test, people must know the typical stopping distance of a car at certain speeds.

Suggest **one** reason why.

[1 mark]

Q9. (2022)

0 5 The stopping distance of a car is the sum of the thinking distance and the braking distance.

0 5. **1** Which factors affect the thinking distance?

[2 marks]

Tick (✓) **two** boxes.

Condition of the tyres

☐

Driving on wet roads

☐

Mass of the car

☐

Tiredness of the driver

☐

Using a mobile phone

☐

Q10. (2022)

0 5. **2** Explain why a person should **not** drink alcohol and then drive.

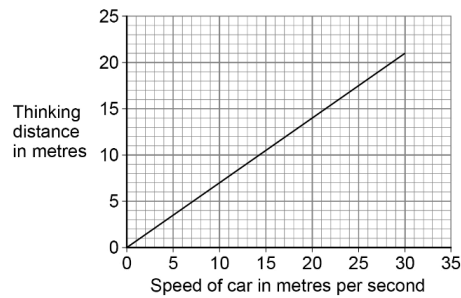
[3 marks]

Q11. (2022)

The Highway Code gives information on how thinking distance depends on the speed of a car.

Figure 7 shows the information as a graph.

Figure 7



a)

0 5. **3** What is the speed of a car if the thinking distance is 16 m?

[1 mark]

Speed of car = _____ m/s

b)

0 5. **4** Describe the relationship between speed and thinking distance.

[2 marks]

c)

0 5. **5** The Highway Code assumes the driver's reaction time is 0.70 seconds.

Draw a line on **Figure 7** to show the relationship for a driver with a reaction time of 1.4 seconds.

[2 marks]

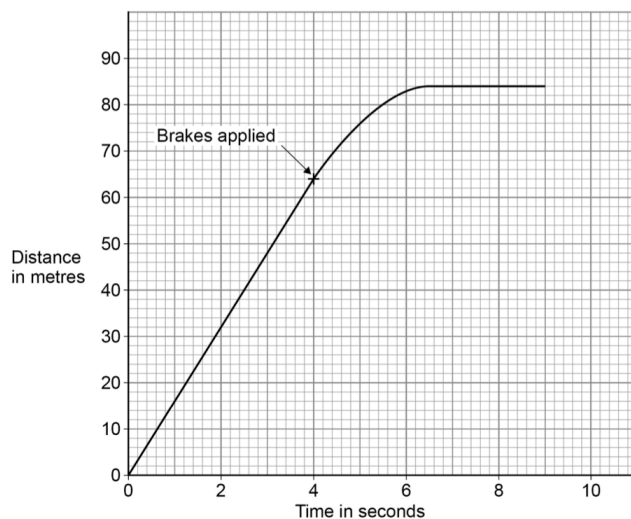
Q12. (2023)

0 2

A car contains a device called a black box. The black box records the distance travelled and the time taken for each journey.

Figure 3 shows the distance–time graph for part of a journey.

Figure 3



The black box also records the deceleration of the car.

a)

0 2 . 4

If the black box records large decelerations, it identifies that the driving may be dangerous.

Why can large decelerations be dangerous?

[2 marks]

Tick (✓) **two** boxes.

The brakes on the car can overheat.

☐

The driver may lose control of the car.

☐

The force applied by the brakes is very small.

☐

The reaction time of the driver increases.

☐

The thinking distance is very short.

☐

b)

0 2 . 5

The black box monitors the speed of the car.

Describe how speed affects braking distance.

[1 mark]

Q13. (2024)

0 5

The stopping distance of a car depends on the thinking distance and the braking distance.

0 5 . 1 Which of the following affects the thinking distance?

[1 mark]

Tick (✓) **one** box.

Condition of the brakes

☐

Icy road conditions

☐

Reaction time of the driver

☐

Q14. (2024)

A car manufacturer tested three different types of tyre which were fitted to three identical cars.

This is the method used.

1. Drive the car along a road.
2. Apply the brakes until the car stops.
3. Measure the distance travelled while braking.
4. Repeat steps 1 to 3 for each car when the road is dry and when the road is wet.

a)

0 5 . 2 The brakes were applied with the same force for each test.

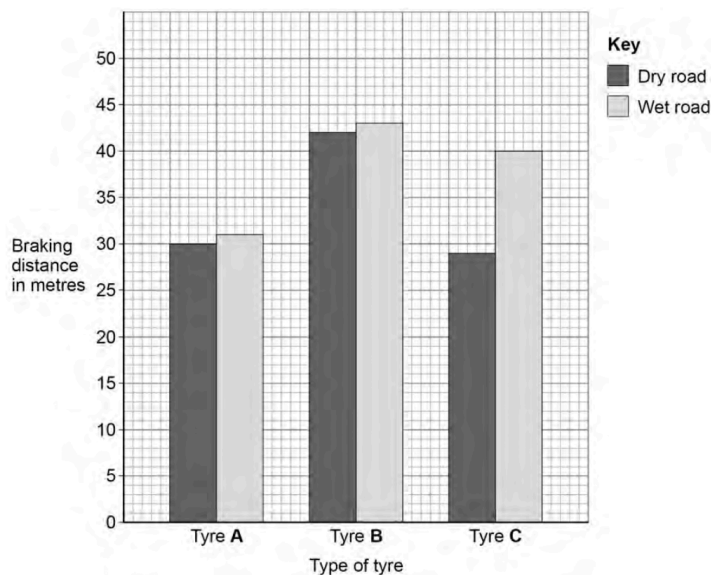
Give **one other** variable that should have been kept the same for each test.

[1 mark]

b)

Figure 10 shows the results.

Figure 10



0 5 . 3 The manufacturer wants to put the safest tyres on a new car.

Evaluate the safety of each type of tyre.

Use **data** from Figure 10.

[6 marks]

c)

When the brakes are applied, a force does work to stop the car.

0 5 . 6 Explain how the force applied by the brakes affects the braking distance of the car.

[2 marks]