Acceleration Practice

1 Is it accelerating? How did you decide?

(a) A cat running north at a steady speed.

(b) An aeroplane just after it lands.

(c) A cyclist turning a corner.

(d) A cow standing in a field.

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2 A train speeds up after passing a signal. The velocities (speeds away from the signal) are in the table below, but one is missing.

Time (s)	0	5	10	15	20
Velocity (m/s)	5	11	17		29

(a) Is it accelerating? How can you tell?

(b) What is the missing velocity?

(c) If it keeps accelerating like this, when will the velocity be 65 m/s?

(d) What is the acceleration in m/s^2?

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3 A bus slows down as it approaches a bus stop.

Time (s)	0	1	2	3
Velocity (m/s)	12	9		3

(a) Is the bus accelerating or not? How can you tell?

(b) What is the missing velocity?

(c) If it keeps decelerating like this, when will it stop?

(d) How much does the velocity change each second?

4 An express train accelerates at 0.5 m/s^2.

(a) Complete the sentence: The velocity gets [ ] m/s greater every second.

(b) Work out the velocity change in fifteen seconds using an equation.

velocity change (m/s)	=	acceleration (m/s^2)	×	time (s)
[ ]	=	0.5	×	15

(c) Work out the velocity change in 60 s using an equation.

velocity change (m/s)	=	acceleration (m/s^2)	×	time (s)
[ ]	=	0.5	×	60

(d) Work out the velocity change in two minutes.

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5 A passenger jet accelerates at 2.5 m/s^2 down a runway.

(a) Complete the sentence: The jet gets [ ] m/s faster every second.

(b) Work out how much time it will take to gain 25 m/s using an equation.

velocity change (m/s)	=	acceleration (m/s^2)	×	time (s)
25	=	2.5	×	[ ]

(c) Work out how much time it will take to gain 50 m/s using an equation.

velocity change (m/s)	=	acceleration (m/s^2)	×	time (s)
50	=	2.5	×	[ ]

(d) Work out the time taken for the jet to reach its take off speed of 75 m/s from rest.

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6 A basketball on Mars is dropped and reaches 21 m/s in 7 s.

(a) Velocity gained in one second = [ ] ÷ [ ] = [ ] m/s

(b) Complete the sentence: The basketball's acceleration (in m/s^2) is [ ].

(c) A diving eagle gains 80 m/s in 5 s. Work out its acceleration using an equation.

velocity gain (m/s)	=	acceleration (m/s^2)	×	time (s)
80	=	[ ]	×	5

(d) Work out the acceleration of a tractor which gains 15 m/s in 5 s.

7 Complete the word equations.

(a) acceleration $=$

(b) velocity change $=$

(c) time taken $=$

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8 A minibus starts at rest and accelerates at 1.5 m/s^2.

(a) How fast will it be going after 6 s?

(b) How much time does it take to reach 15 m/s?

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9 A cheetah sighting prey starts at 6 m/s and accelerates to 26 m/s in 4 s.

(a) How much velocity does it gain each second?

(b) What is its acceleration in m/s^2?

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10 A motorcycle starts at rest and accelerates at 6 m/s^2.

(a) How fast will it be going after 4 s?

(b) How much time does it take to reach 30 m/s?

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11 A red car goes from 0 to 24 m/s in 4 s.
A blue car goes from 0 to 35 m/s in 5 s.

(a) Calculate the acceleration of the red car.

(b) Calculate the acceleration of the blue car.

(c) Which car has the greater acceleration?