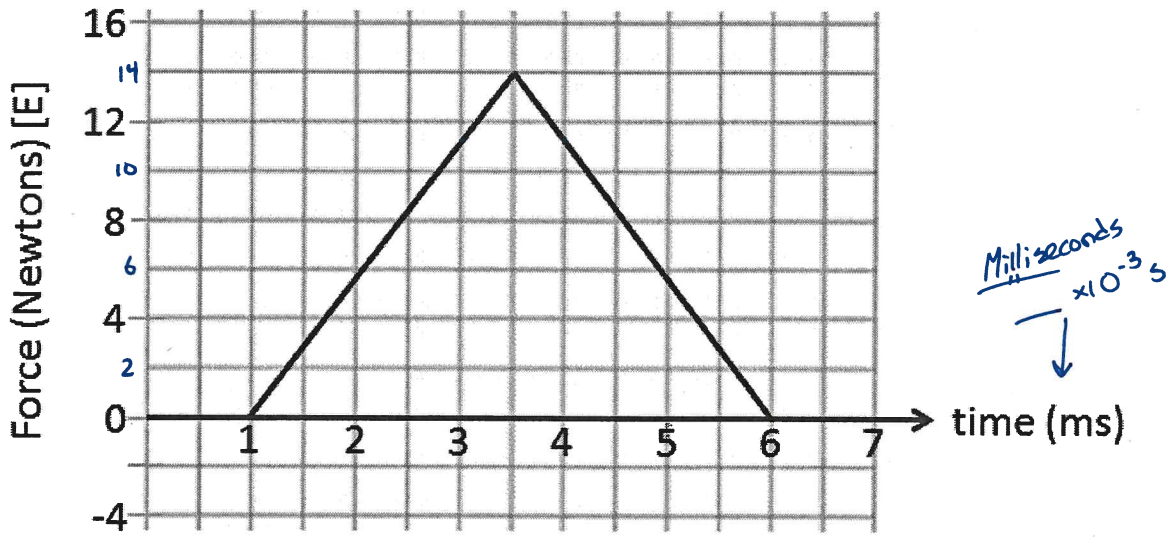
KEY

First Name:_____ Last Name:_____

L04 – FQ – Impulse and Impulse Graphs

Use the following information to answer Q1-Q2:

A *Force-Time* graph for a variable force acting on a 15g object is depicted below.



Q1: The magnitude of the impulse acting on the object is ***a.bc*** x 10^{-d} Ns, where ***a, b, c,*** and ***d*** are ___, ___, ___, and ___.

*(Record your **four digit** answer in the Numerical Response boxes below)*

3	5	0	2

Area = $\frac{1}{2}bh$
$= \frac{1}{2}(5\times10^{-3})(14)$
$= 0.035$ Ns
Impulse = 3.50×10^{-2} Ns
$a.bc \times 10^{-d}$

Q2: If the object is initially stationary, the final speed of the object is_____ m/s [East].

*(Record your **three digit** answer in the Numerical Response boxes below)*

2	.	3	3

$F\Delta t = m\Delta v$
$0.035 = m\Delta v$
$0.035 = (0.015)\Delta v$
$\Delta\vec{v} = 2.33$ m/s [E]
If $\vec{v}_i = 0$, then $\vec{v}_f = 2.33$ m/s [E]

KEY

Use the following information to answer Q3:

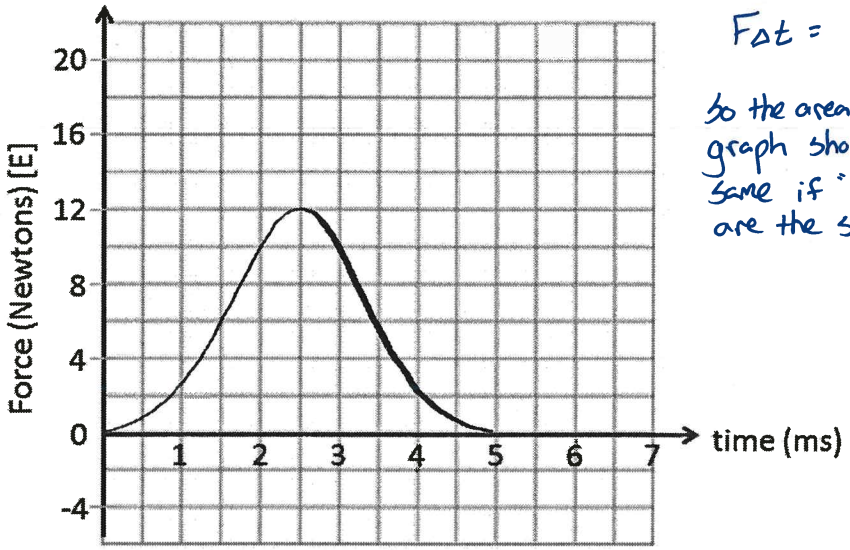
A remote controlled toy car is travelling at top speed prior to braking. The breaks exert a variable stopping force on the car, bringing it to a stop, as depicted below.

Area under graph

Fixed Fixed

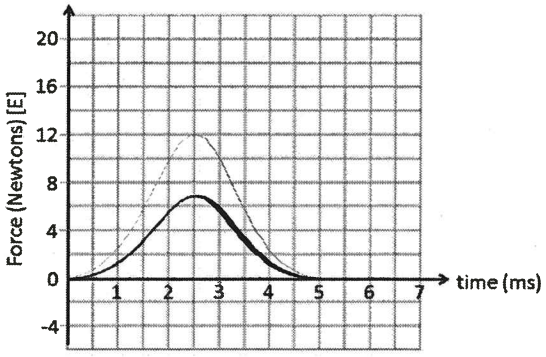
$F\Delta t = m\Delta v$

So the area under the graph should be the same if "m" and "Δv" are the same.

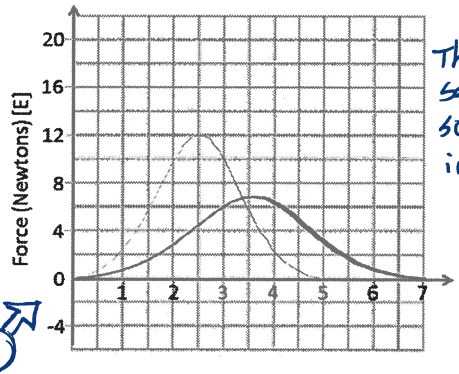


Q3: The car is again travelling at top speed prior to braking, but this time the breaks are applied with a different force, again bringing the car to a stop. Which graph best illustrates this situation?

a.

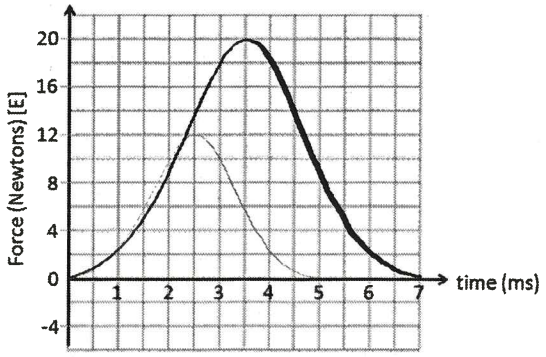


b.

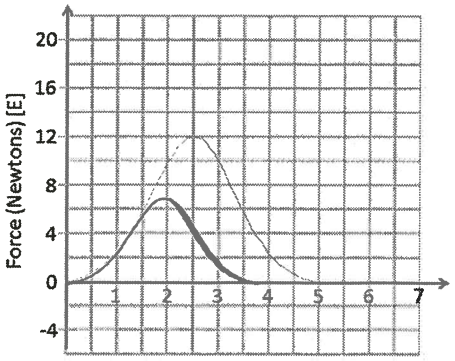


This one has same area ($F\Delta t$), so same change in momentum.

c.



d.



KEY

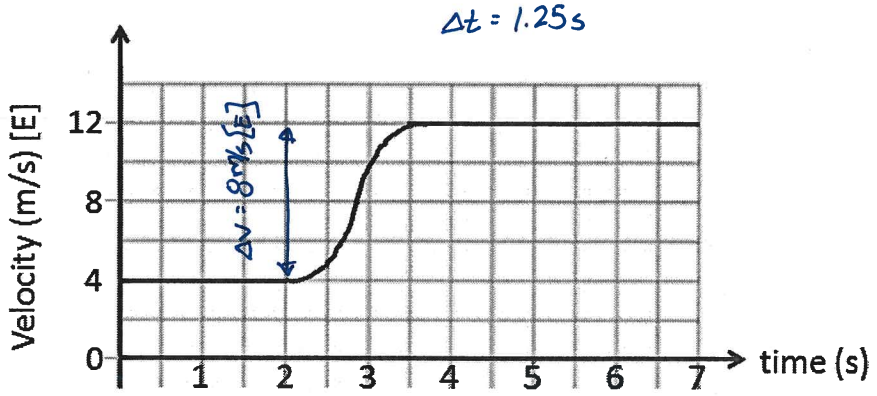
Use the following information to answer Q4-Q5:

m = 0.5 kg

Velocity of a 500g Toy Car.

A variable force is applied to the car between 2.25s and 3.50s, causing it to accelerate.

Δt = 1.25 s



Q4: What is the magnitude of the impulse that acted on the car between 2.25 and 3.50 seconds?

*(Record your **three digit** answer in the Numerical Response boxes below)*

4	.	0	0

$F\Delta t = m\Delta v$

Impulse $= m\Delta v$

$= (0.5)(8)$

$= 4.00$ Ns

Q5: What is the magnitude of the ***average force*** acting on the car during this time, measured in Newtons?

*(Record your **three digit** answer in the Numerical Response boxes below)*

3	.	2	0

$F\Delta t = m\Delta v$

$F(1.25) = (0.5)(8)$

$F = 3.20$ N

MARKING:

Beginning	0.0 – 2.0
Progressing	2.5 – 3.5
Competent	4.0 – 4.5
Exemplary	5.0