Forces and motion – *Mark scheme*

1. (a) 60   1

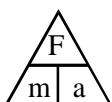   (b) $5\frac{1}{2}$ hours   must include unit   1

   (c) 30   1

   (d) 30 minutes or $\frac{1}{2}$ hour   1

   must include unit

   (e) D **and** E   *accept finish for E*   1

   accept correct numbers from axes with units

   least steep part of the graph   1

   accept covers smallest distance in a set time; accept only moves 5 km in 1 ½ hours (accept anything between 5 and 6)

   ignore horse is tired

                                                                                                                                            [6]

2. (a) concentration / tiredness / drugs / alcohol   1

   accept any reasonable factor that could affect a driver's reactions

   *do **not** accept speed or any physical condition unrelated to the driver*

   (b) 31.25   *credit for **1** mark correct attempt to calculate the area under the slope **or** for using the equation*   3
   distance = <u>average</u> velocity (speed) × time

   *credit for **1** mark use of correct velocity change (12.5) <u>and</u> correct time (5) **or** answer of 62.5*

   (c) 2.5   3

   *credit for **1** mark triangle drawn on slope **or** correct equation **or** two correct pairs of coordinates*

   credit for 1 mark use of correct velocity change (12.5) and correct time (5)
   accept time = between 4.8 and 5.2 if used in (b)

   do not accept an attempt using one pair of coordinates taken from the slope

   metres / second / second **or** metres / second / squared **or** m/s^2 **or** ms^{-2} 1

   (d) (i) force = mass × acceleration   1

      accept correct transformation
      accept F = m × a

      accept F / m | a *provided*

      subsequent use of ∆ is correct
      *do **not** accept an equation in units*

      (ii) 2250   2

      credit their (c) × 900 for 2 marks
      *credit **1** mark for correct substitution*

                                                                                                                                          [11]