Situation 4

① $d = 115 ft$ $\quad d = \left(\frac{115}{5280}\right)$ miles $= 0.02178$ miles

$s = \sqrt{21d}$

$\therefore \quad s = \sqrt{21 \times 115} = 49.14$ mph

② $s = \sqrt{21d}$

$\frac{s^2}{21} = d = \frac{60^2}{21} = 171.43$ feet

③ $d = 0 \leq d \leq 171.43.$

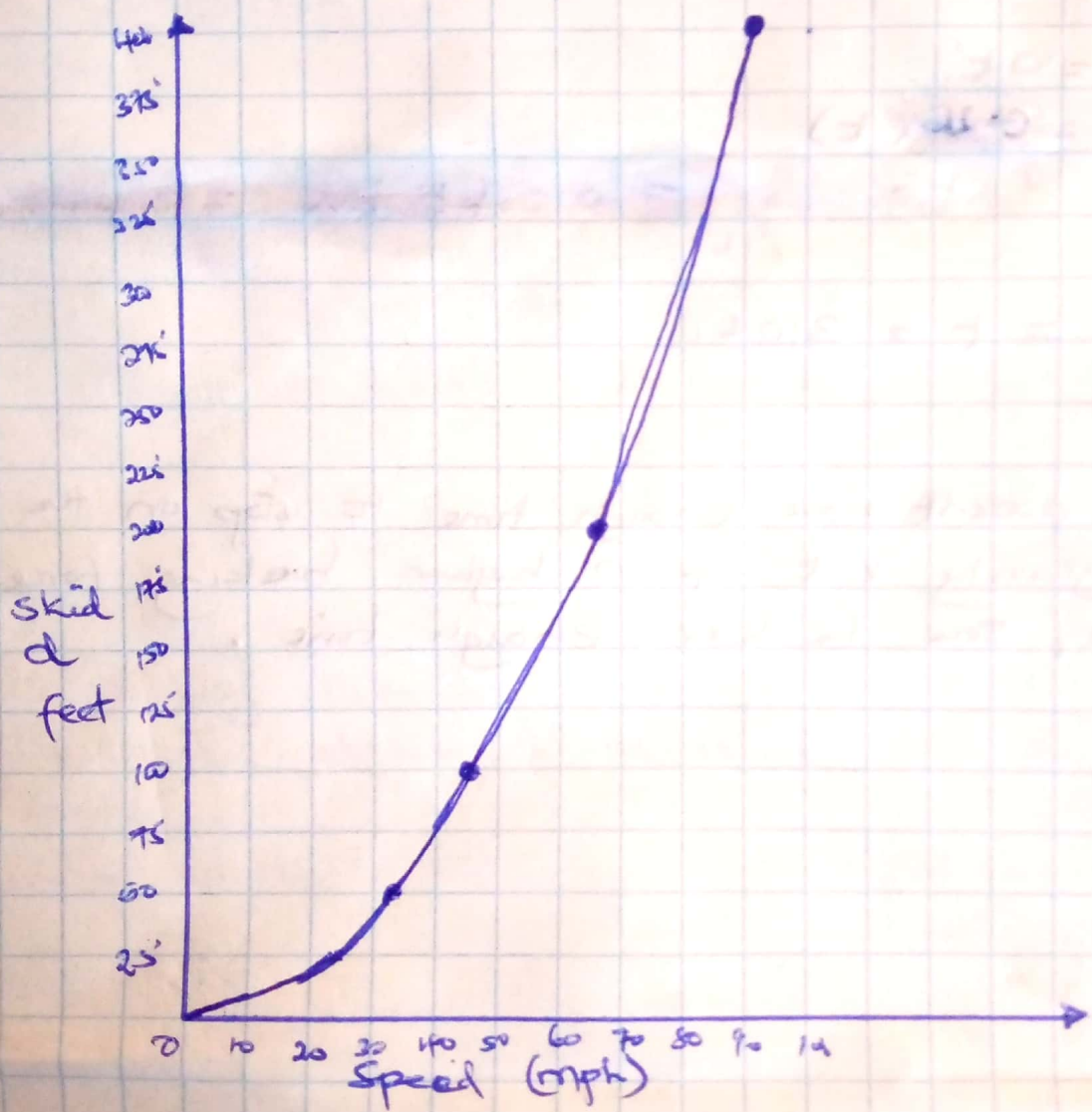
$s = 0 \leq s \leq 60$

The domain is a set of all distances that are travelled to bring the car to a stop which is therefore between 0 and the travelled distance in skidding and the range is the output of the speed from 60 to zero after skidding is complete.

(4)

Skid	25	50	100	200	400
Speed	22.91	32.4	45.83	64.81	91.65

$$S = \sqrt{21d}$$



From the table the speed doubles only when the distance is multiplied by 4 from a reference distance say d, the speed shall be $2s$ when $d' = 4d$

$$2s = \sqrt{21 \times 4d}$$

Situation 2

① We know $S = \sqrt{21d}$

$S^2 = 21d \Rightarrow d = \frac{S^2}{21}$

② $d = 142$ feet

$S = 30$

$V_f^2 = V_c^2 + \sqrt{21d}$

$V_f^2 = 30^2 + \sqrt{21 \times 143}$.

$V_f^2 = 90 + 3003 \Rightarrow V_f^2 = 3903$

$\therefore V_f = 62.47$ mph $\Rightarrow$ original speed

③ The thinking distance
The friction static of the road
slope
Curve on the road

④ $S = 55$ mph
$d = 150$ ft

From newtons laws of motion

$S = ut - \frac{1}{2}at^2$. and $V^2 = u^2 - 2ar$

$V = 0$
$u = 55$

D in miles $= \frac{150}{5280} = 0.0284$ miles.

$u = \frac{55 \times 5280}{3600}$

$= 80.67$ ft/s

$$\frac{-V^2+u^2}{2s} = a = \frac{55^2-0}{2(0.0284)} \Rightarrow = \frac{80.67 \text{ ft/s}}{2(155)} = 0.26$$

$$= 0.26 \text{ ft/s}^2$$

& $V = u + at$ = $V = u - at$ because it's decceleration

$V = 0$

$\therefore u = at$

$\frac{5280}{3600} \times 55 = 0.26(t)$

$\frac{80.67}{0.26} = t = 310\,s$

The driver doesn't have enough time to stop on the effect of gravity but if a higher breking force is applied, then he has enough time.

$\frac{80.67}{0.26}$