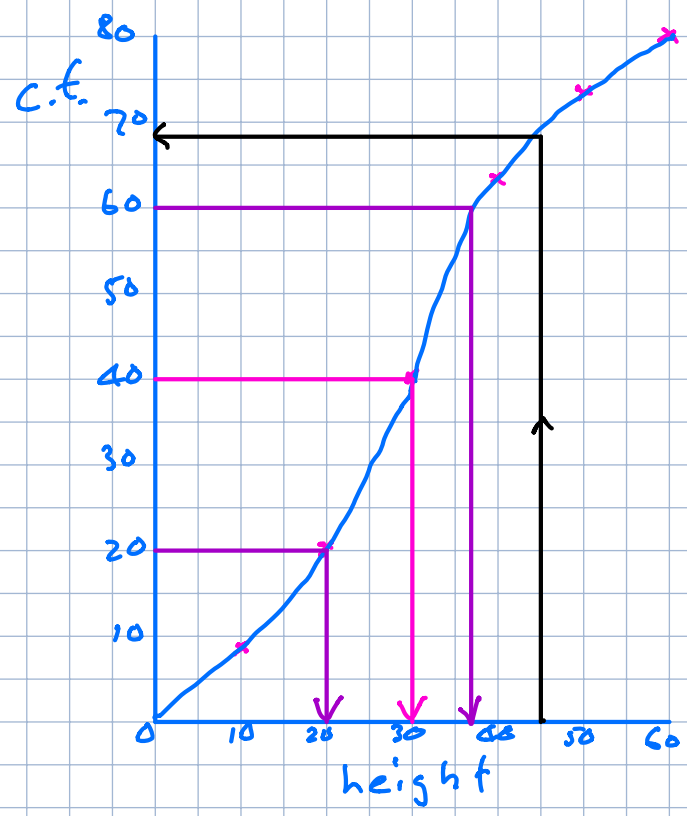
Cumulative Frequency

height (cm)	freq	c.f
0 - 10	8	8
10 - 20	12	20
20 - 30	20	40
30 - 40	24	64
40 - 50	10	74
50 - 60	6	80



Plot right hand edge of each interval

Join with smooth curve or line segments

Median 80 in sample so 40th = 30 cm

IQR = $Q_3 - Q_1$ $60^{th} - 20^{th}$ 37 − 20 = 17 cm

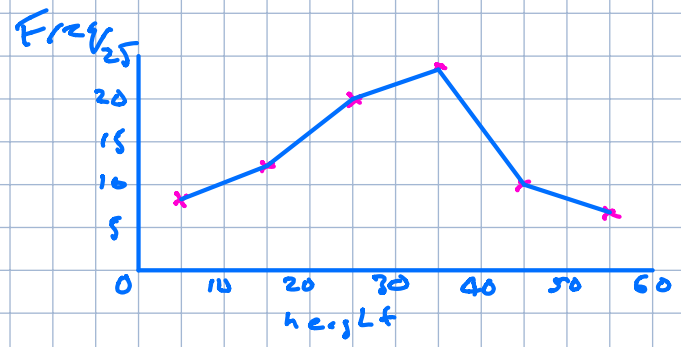
Estimate how many plants exceeded 45 cm

= 80 − 68 = 12 plants

Frequency Polygons

Silly name as they are not closed polygons

From above example



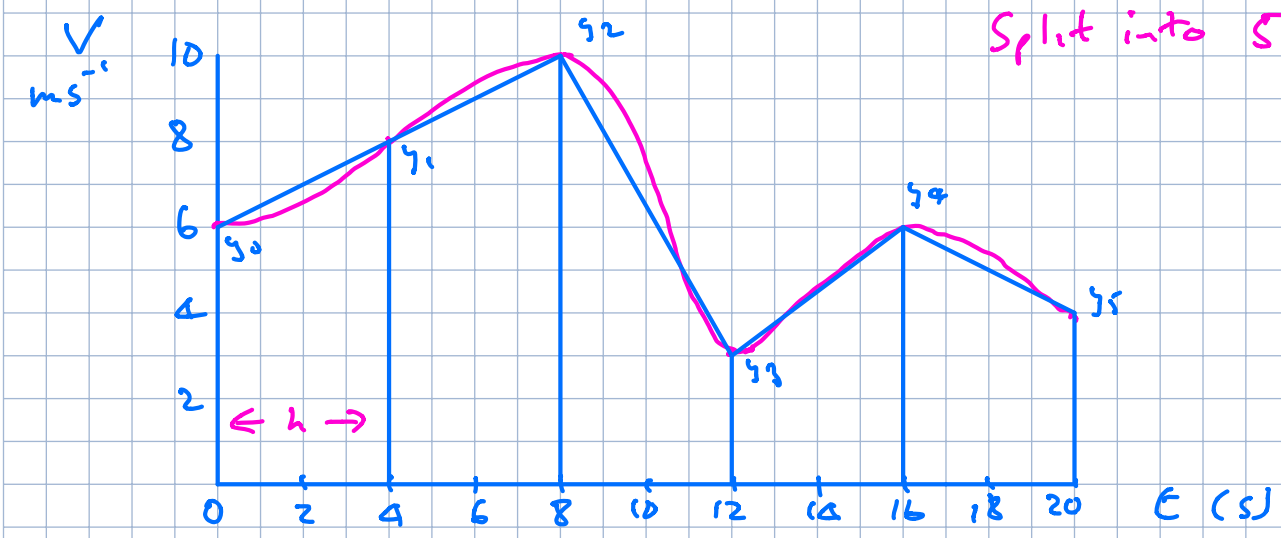
Plot midpoints of intervals for frequencies

Join with straight line segments

Do not join to horizontal axis. Leave open.

Velocity - Time Graph

Find distance travelled



Split into 5 strips

$$\text{Area} = \frac{h}{2}\left[y_0 + 2(y_1 + y_2 + y_3 + y_4) + y_5\right]$$

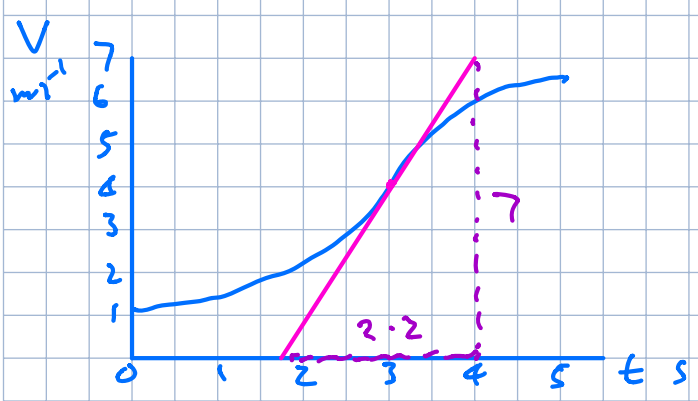
Distance = Area

$$= \frac{4}{2}\left[6 + 2(8 + 10 + 3 + 6) + 4\right]$$

$$= 2\left[64\right] \qquad = 128\text{ m}$$

Velocity Time Graph - Find acceleration

Acceleration is gradient of velocity time graph



Find acceleration when $t = 3s$

Draw tangent to graph at $t = 3s$

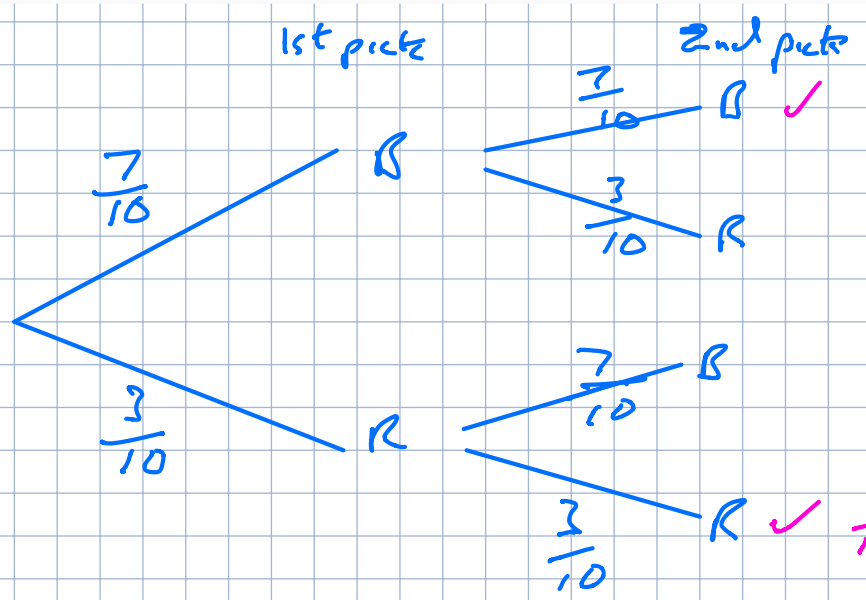
$$\text{gradient} = \frac{7}{2.2} = 3.2\text{ ms}^{-1}$$

Probability Trees

1. A bag contains 7 blue balls and 3 red balls. A ball is selected at random, its colour noted and it is replaced. A second ball is selected at random and its colour noted. Represent the various possible outcomes on a probability tree and calculate:

a) The probability both balls selected are the same colour.

b) The probability at least one of the balls is red.



$\frac{7}{10} \times \frac{7}{10} = \frac{49}{100}$

$\frac{3}{10} \times \frac{3}{10} = \frac{9}{100}$

a) $P(\text{Both same colour}) = \frac{49}{100} + \frac{9}{100} = \frac{58}{100}$

b) $P(\text{At least 1 red})$

$= 1 - P(BB) = 1 - \frac{7}{10} \times \frac{7}{10}$

$= 1 - \frac{49}{100} = \frac{51}{100}$

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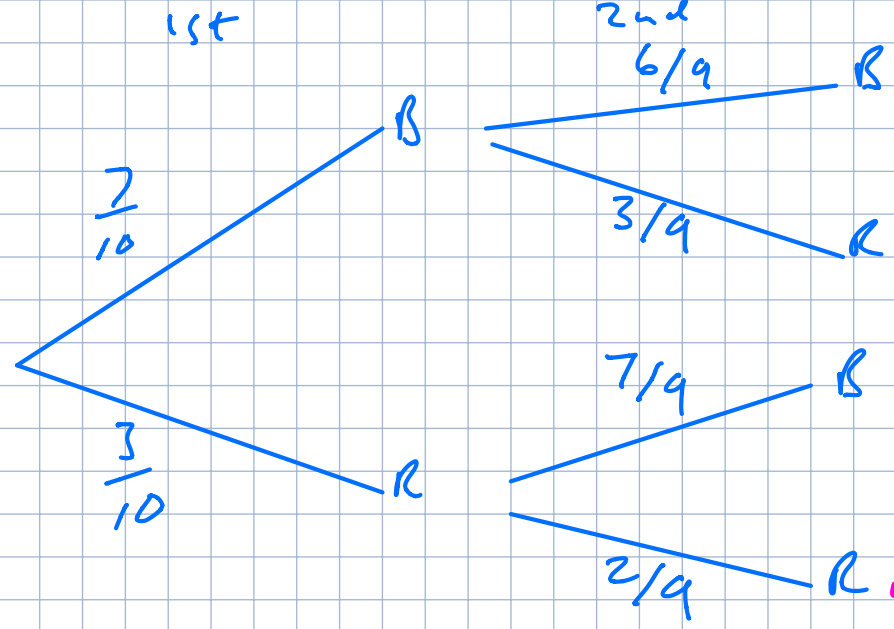
4. A bag contains 7 blue balls and 3 red balls. A ball is selected at random, its colour noted BUT IT IS NOT REPLACED. A second ball is selected at random and its colour noted. Represent the various possible outcomes on a probability tree and calculate:

a) The probability both balls selected are the same colour.

b) The probability at least one of the balls is red.

This last question is an example of conditional probability where the out come of one event affects the probability of another.



$\frac{7}{10} \times \frac{6}{9} = \frac{42}{90}$

$\frac{3}{10} \times \frac{2}{9} = \frac{6}{90}$

$P(\text{Same Colour}) = \frac{42}{90} + \frac{6}{90} = \frac{48}{90}$