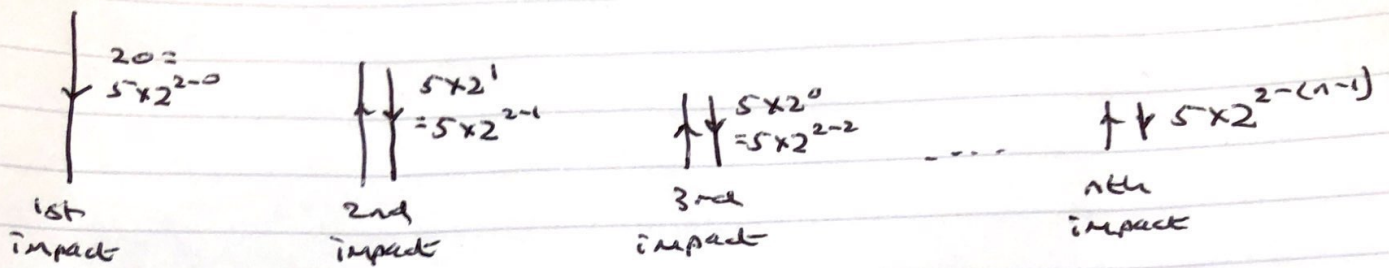


4b) After n bounces the ball reaches a height of 5×2^{2n}



Total distance

$$= 20 + 2(5 \times 2^{2-1}) + 2(5 \times 2^{2-2}) + \dots + 2(5 \times 2^{2-(n-1)})$$

$$= 20 + 2 \times 5 (2^{2-1} + 2^{2-2} + \dots + 2^{2-(n-1)})$$

$$= 20 + 10 \left(\frac{2 \left(1 - \frac{1}{2}^{n-1} \right)}{1 - \frac{1}{2}} \right)$$

$$a = 2^{2-1} = 2$$

$$r = 2^{-1} = \frac{1}{2}$$

$$"n" = n - 1$$

$$= 20 + 40 \left(1 - \frac{1}{2}^{n-1} \right)$$

$$= 20 + 40 (1 - 2^{1-n})$$

$$= 20 + 40 - 40 \times 2^{1-n}$$

$$= 60 - 5 \times 2^3 \times 2^{1-n}$$

$$= 60 - 5 \times 2^{4-n}$$