Parnell College
Algebra Revision

1 13, 26, 39, 52, 65
(+13 +13 +13 +13)
the number is 52

2 113, 106, 99, 92, 85
(−7 −7 −7 −7)
the number is 113

3 45, 40.5, 36, 31.5, 27
(−4.5 −4.5 −4.5 −4.5)
the number is 36

4 18, 27, 36, 45, 54
(+9 +9 +9 +9)
the number is 27

5 800 000, 40 000, 2000, 100, 5
(÷20 ÷20 ÷20 ÷20)
the number is 2000

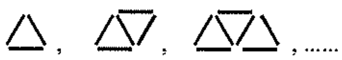
6 1, 2, 6, 24, 120,
(×2 ×3 ×4 ×5)
the number is 120

7 a $M = 3 \times n + 2$ where M is the number of matchsticks and n is the number of units.

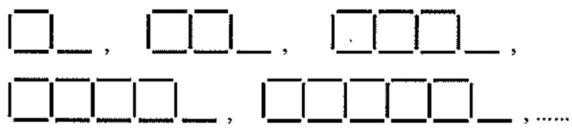
b Example:

8 a $M = 2 \times n + 1$ where M is the number of matchsticks and n is the number of units.

b Example:



9 a



b

Unit number (n)	1	2	3	4	5	6
Matches needed (M)	5	8	11	14	17	20

+3 +3 +3 +3 +3

c As the n values increase by 1, the M values increase by 3. So $M = 3 \times n \pm \square$.

If $n = 1$, $M = 5$ and $5 = 3 \times 1 + 2$

$\therefore$ the rule is $M = 3 \times n + 2$

d When $n = 17$, $M = 3 \times 17 + 2$
$= 51 + 2$
$= 53$

So 53 matches are needed.

10 a

b

Unit number (n)	1	2	3	4	5	6
Matches needed (M)	2	5	8	11	14	17

+3 +3 +3 +3 +3

c As the n values increase by 1, the M values increase by 3. So $M = 3 \times n \pm \square$.

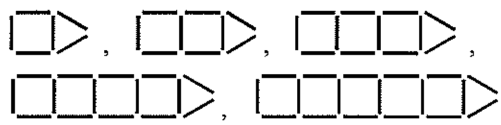
If $n = 1$, $M = 2$ and $2 = 3 \times 1 - 1$

$\therefore$ the rule is $M = 3 \times n - 1$

d When $n = 32$, $M = 3 \times 32 - 1$
$= 96 - 1$
$= 95$

So 95 matchsticks are needed.

11 a



b

Unit number (n)	1	2	3	4	5	6
Matches needed (M)	6	9	12	15	18	21

+3 +3 +3 +3 +3

c As the n values increase by 1, the M values increase by 3. So $M = 3 \times n \pm \square$.

If $n = 1$, $M = 6$ and $6 = 3 \times 1 + 3$.

$\therefore$ the rule is $M = 3 \times n + 3$.

d When $n = 59$, $M = 3 \times 59 + 3$
$= 177 + 3$
$= 180$

So 180 matchsticks are needed.

12 As the n values increase by 1, the M values increase by 2. So $M = 2 \times n \pm \square$.

If $n = 1$, $M = 4$ and $4 = 2 \times 1 + 2$.

$\therefore$ the rule is $M = 2 \times n + 2$

When $n = 495$, $M = 2 \times 495 + 2$
$= 990 + 2$
$= 992$

13 As the n values increase by 1, the M values increase by 6. So $M = 6 \times n \pm \square$.

If $n = 1$, $M = 8$ and $8 = 6 \times 1 + 2$.

$\therefore$ the rule is $M = 6 \times n + 2$.

When $n = 37$, $M = 6 \times 37 + 2$
$= 222 + 2$
$= 224$

14 As the n values increase by 1, the M values increase by 11. So $M = 11 \times n \pm \square$.

If $n = 1$, $M = 8$ and $8 = 11 \times 1 - 3$.

$\therefore$ the rule is $M = 11 \times n - 3$.

When $n = 121$, $M = 11 \times 121 - 3$
$= 1331 - 3$
$= 1328$

15 As the n values increase by 1, the M values increase by 4. So $M = 4 \times n \pm \square$.

If $n = 1$, $M = 6$ and $6 = 4 \times 1 + 2$.

$\therefore$ the rule is $M = 4 \times n + 2$.

When $n = 441$, $M = 4 \times 441 + 2$
$= 1764 + 2$
$= 1766$

16 The values of C for $n = 0, 1, 2, 3$ are:

n	0	1	2	3
C	1800	2600	3400	4200

+800 +800 +800

a As the n values increase by 1, the C values increase by 800.

This suggests that $C = 800 \times n \pm \square$.

If $n = 1$, $C = 2600 = 800 \times 1 + 1800$

$\therefore$ the rule is $C = 800 \times n + 1800$

b When $n = 5$, $C = 800 \times 5 + 1800$
$= 4000 + 1800$
$= 5800$

So the charge is \$5800.

17 **a** $7 + s = 18$
$\therefore$ $s = 11$

b $2 \times m - 4 = 12$
$\therefore$ $2 \times m = 16$
$\therefore$ $m = 8$

18 **a** $3 + m = 14$
$\therefore$ $m = 11$

b $f \times 7 - 5 = 51$
$\therefore$ $f \times 7 = 56$
$\therefore$ $f = 8$

19 **a** The tap was turned so that the water was flowing into the bath at a slower rate.

b The tap was turned off.

c A person got into the bath.

d The person got out of the bath.

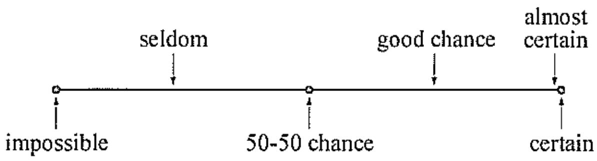
20 **a** He was delayed between the 5 and 6 minute marks (the graph is flat), so he was delayed 1 minute at the lights.

b The boy travelled slowest between the 6 minute and 10 minute marks, so he was going up-hill. He reached the top of the hill at the 10 minute mark of his trip.

Parnell College
Algebra

1 a certain b unlikely c highly likely

2



3 a Yes, the chance that the apple is red is 39 in 40. The chance that the apple is green is only 1 in 40.

b no

c false

4 There are six tickets which could be selected with equal chance.

a Since three are red there is a 3 in 6 chance of selecting a red
$\therefore$ the probability of a red is $\frac{3}{6}$.

b Since three are red and three are blue there is a 6 in 6 chance of selecting a red or blue
$\therefore$ the probability of a red or blue is $\frac{6}{6} = 1$, in other words, it is certain.

c There are no yellow tickets
$\therefore$ the probability of a yellow is $\frac{0}{6} = 0$, in other words it is impossible.

5 There are 14 sweets which could be selected with equal chance.

a i Since seven are chocolates there is a 7 in 14 chance of selecting a chocolate
$\therefore$ the probability of a chocolate is $\frac{7}{14}$.

ii Since seven are caramels there is a 7 in 14 chance of selecting a caramel
$\therefore$ the probability of a caramel is $\frac{7}{14}$.

b If all the chocolates are eaten there are no chocolates left and seven caramels
$\therefore$ the probability of a chocolate is $\frac{0}{7} = 0$

6 4 faces are purple, 2 are pink.

a P[a purple] $= \frac{4}{6}$

b P[a pink] $= \frac{2}{6}$

c P[a black] $= \frac{0}{6} = 0$

7 The equally likely outcomes are:
1, 2, 3, 4, 5 and 6.

a A 2 is one of the 6 possibilities.
$\therefore$ P[2] $= \frac{1}{6}$

b There are three even possibilities (2, 4 and 6)
$\therefore$ P[an even] $= \frac{3}{6} = \frac{1}{2}$

c There are two possibilities greater than 4 (5 and 6)
$\therefore$ P[greater than 4] $= \frac{2}{6} = \frac{1}{3}$

8 The equally likely outcomes are:
A, B, C and D.

a B and D are two of the 4 possibilities
$\therefore$ P[B or D] $= \frac{2}{4} = \frac{1}{2}$

b There is one vowel (A)
$\therefore$ P[a vowel] $= \frac{1}{4}$

c S is not one of the possibilities
$\therefore$ P[S] $= \frac{0}{4} = 0$

9 The equally likely outcomes are:
1, 2, 3, ... 8.

a 2 and 4 are two of the 8 possibilities
$\therefore$ P[2 or 4] $= \frac{2}{8} = \frac{1}{4}$

b There are no possibilities greater than 8
$\therefore$ P[greater than 8] $= \frac{0}{8} = 0$

c These are seven possibilities less than 8 (1, 2, 3, ... , 7)
$\therefore$ P[less than 8] $= \frac{7}{8}$

10 There are 52 cards, all equally likely to be selected.

a P[a spade] $= \frac{13}{52} = \frac{1}{4}$ {13 out of 52 poss.}

b P[an ace] $= \frac{4}{52} = \frac{1}{13}$ {4 out of 52 poss.}

c P[a King or Queen] $= \frac{8}{52} = \frac{2}{13}$
{8 out of 52 possible}

d P[a black Jack] $= \frac{2}{52} = \frac{1}{26}$
{two out of 52 possible}

11 a The possible results are:
H1, H2, H3, H4, H5, H6,
T1, T2, T3, T4, T5, T6

b There are 12 possible results.

c P[T1, T3 or T5] $= \frac{3}{12} = \frac{1}{4}$

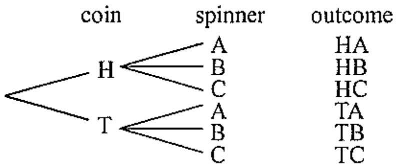
12 There are 16 equally likely outcomes:
A1, A2, A3, A4, B1, B2, B3, B4,
B1, B2, B3, B4, C1, C2, C3, C4

a P[A1] $= \frac{1}{16}$

b P[an A and an odd] $= \frac{2}{16} = \frac{1}{8}$
{two possibilities; A1 and A3}

c P[B1] $= \frac{2}{16} = \frac{1}{8}$

13

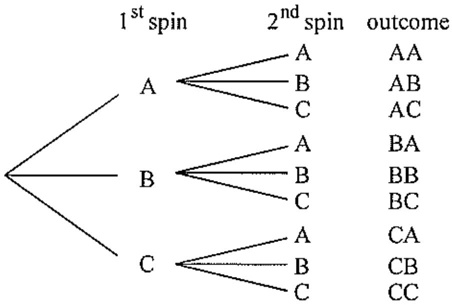


a P[a head and an A] $= \text{P[HA]}$
$= \frac{1}{6}$

b P[a tail and a B or C] $= \text{P[TB or TC]}$
$= \frac{2}{6} = \frac{1}{3}$

c P[an A] $= \text{P[HA or TA]}$
$= \frac{2}{6} = \frac{1}{3}$

14 **a**



b **i** P[two As] $= \text{P[AA]}$
$= \frac{1}{9}$

ii P[B followed by C] $= \text{P[BC]}$
$= \frac{1}{9}$

iii P[an A and a B] $= \text{P[AB or BA]}$
$= \frac{2}{9}$