

ANSWERS TO THE
UNIT A - PROBABILITY
&
UNIT E –
PERMUTATIONS AND
COMBINATIONS
WORKBOOK

ANSWERS

1-1 $\{(1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)\}$

1-2 a. $\{(1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (7, H), (8, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T), (7, T), (8, T)\}$ b. $P(\text{Odd AND Tail}) = 0.250$
c. $P(\text{mult of 3 AND head}) = 0.125$

1-3. a. sample space set. B. 0.25 c. 0.10 d. no doubles e. 0.90

1-4. 31.6% b. 99.6%

1-5. 4 blue, 6 green, 3 orange, 3 purple

1-6a. 13:7 b. 7:13 c. reversed

1-7 a. 3:23 b. 1:1

1-8 3 : 1

1-9. a. 1:7 b. 1:1 c. 1:1 d. 5:3

1-10. $\frac{3}{8}$

2-1. a. dependent b. dependent c. independent

2-2. $\frac{1}{12}$

2-3. $\frac{1}{12}, \frac{1}{24}, \frac{3}{8}$

2-4. a. 0.006 b. 0.005 c. 0.125 d. 0.118 e. 0.063 f. 0.038
g. 0.00000369 so in practice we would call this zero!

2-5. 0.278

2-6. 0.727

3-1. a) Non-mutually exclusive. One common outcome is a queen of hearts.
b) Mutually exclusive.
c) Non-mutually exclusive. 3 is prime and a multiple of 3.

3-2. a. 0.533 b. 1 c. 0.600 d. 0.333

3-3. a. 0.308 b. 0.538 c. 0.308

3-4. a. 0.278 b. 0.417 c. 0.500

3-5. 0.733

3-6. 0.514

3-7. a. 0.694 b. 0.068

3-8. 0.772

3-9. 0.439

4-1. a. {(HHH), (HHT), (HTH), (THH), (HTT), (THT), (TTH), (TTT)}

b. $\frac{3}{8}$

4-2. a. 0.231 b. not face cards c. 0.769

4-3. a. set b. 0.065 c. $\frac{1}{2}$ d. 4 ways e. 32 ways

4-4. a. 0.216 b. 0.432 c. 0.936

4-5. a. colour accordingly b. 27%

4-6. a. 1:5 b. 7:5

4-7. a. 19:6 b. 6:19

4-8. a. $\frac{15}{48}$ or 0.313 b. $\frac{15}{48}$ or 0.313

4-9. a. 0.111 b. 0.095 c. 0.222 d. 0.133

4-10. 0.429

4-11. a. 0.500 b. 0.423 c. 0.654

4-12. 0.269

4-13. 0.833

4-14. 0.791

ANSWERS

Full solutions , with steps, are available at the Mb Distance Learning website.

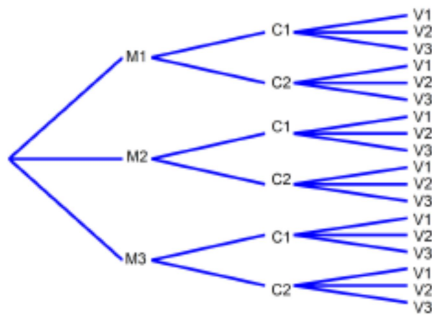
- 1-1. a. 108 pizzas b. 1188 pizzas
 1-2. 48 equipment combinations
 1-3. 108 combinations
- 1-4. 17, 576, 000 license plates
 1-5. 2600 Postal Codes
 1-6. 120 ways
- 1-7. 350 ways
 1-8. a. 1 5 10 10 5 1 b. c and d c. 5/32
- 2-1. a. 4! b. 7! c. 5! d. 10!
 2-2. a. 6 b. 5 c. 66 d. 252
 2-3. a. ${}_{11}P_8$ b. ${}_5P_4$
- 2-4. a. $7! = 5040$
 2-5. $6! = 720$ ways
 2-6. 2730 ways
- 2-7. 132 ways
 2-8. 2, 177, 280 set lists
 2-9. 480 ways (hint: calculate total ways with no restrictions, subtract ways of what you don't want)
- 3-1. a. 360 ways b. 60 ways c. 240 ways
 3-2. a. 360 ways b. 120 ways c. 24 ways d. 48 ways
 3-3. a. 180 numbers b. 30 numbers c. 48 numbers d. 100 numbers
- 3-4. a. 720 ways b. 240 c. 48 d. Jade and Rebecca are girls
 3-5. a. 720 ways b. 48 ways c. 144 ways d. 72 ways
 3-6. a. 3,628,00 b. 28,800 c.
 3-7. 120 ways
- 3-8. a. 36 b. 4
 3-9. a. 3360 b. 480 c. 120
 3-10. a. 907,200 b. 816,480
- 3-11. 34 (hint: one nbr starts with 63, 9 are ≥ 640 , 24 nbrs start with 8 or 9)
 3-12. 1440
- 4-1. 21 ways to chose marbles
 4-2. a. 3060 b. 680 c. 1365
 4-3. a. 171,600 b. 192,192
- 4-4. 336 to select party stuff

- 4-5. 4872 (210 with no pottery, 1512 with one pottery, 3150 with 2 pottery)
 4-6. 781 ways with at least one woman. (816 ways to make a committee with no genre restrictions, 35 ways to make a committee with no women)

4-7. a. $P(\text{rose no on ends}) = 0.6$

4-8. 0.063 (20,349 ways without restriction; 1,287 ways with no hockey players)

5-1. 18 different pizzas



5-2. 80 sundaes

5-3. 26

5-4. 900

5-5. 336

5-6. ${}_{13}P_6$

5-7. a. 720 b. 240

5-8. a. 118 (hint: 120 unrestricted ways to stand, 2 ways to stand correctly depending on which end they are at)

5-9. a. 362,800 b. 40,320 c. 282,240 (hint: $9! - 8!2!$)

5-10. a. 4,360 distinguishable ways

5-11. 60

5-12. 27,720

5-13. a. 420 b. 60 c. 300

5-14. a. ${}_9P_5 = 15,120$ b. $6 \cdot 8! = 241,900$

5-15. a. 216 b. 180 c. 36 d. 24

5-16. a. 3,628,000 b. 3,840

5-17. 80 ways

5-18. 560

5-19. a. 3003 b. 3,628,800

5-20. a. 1,287 all 5 spades b. 712,842 two hearts exactly

c. $171,600 + 19,800 + 792 = 192,192$ at least 3 face cards

5-21. a. 4,368 b. 1,764 c. 4,242 d. 21

5-22. 63 combos

5-23. 120 different routes