

Grid Game 1

A cupboard has five shelves numbered 1 through 5, from bottom to top; each shelf has two compartments. There are eight items—A, B, C, D, E, F, G, H—in the cupboard, no two of which are in the same compartment.

Items D and E are on the same shelf.

B is on the shelf directly below G.

If a shelf contains only one item, it cannot be directly above or directly below another shelf that contains only one item.

C is the only item on one of the shelves.

There is only one item on the fourth shelf.

1. If H is on the fourth shelf, which one of the following CANNOT be true?
 - (A) A is on the second shelf.
 - (B) D and E are on the second shelf.
 - (C) D and E are on the top shelf.
 - (D) C is on the first shelf.
 - (E) A is on the third shelf.

2. Which one of the following is a complete and accurate list of the items any one of which could be on the top shelf?
 - (A) D
 - (B) D, E, G, C
 - (C) D, E, G, B
 - (D) D, E, G, C, F
 - (E) D, E, G, H, F, A

3. Which one of the following must be true?
 - (A) If A is on the third shelf, then E is not on the top shelf.
 - (B) If E is on the second shelf, then C is not on the bottom shelf.

4. If G is on the top shelf and A is on the third shelf, then which one of the following must be true?
 - (A) D is on the first shelf.
 - (B) E is on the second shelf.
 - (C) C is on the fourth shelf.
 - (D) Either F or H must be on the same shelf as A.
 - (E) F is on the same shelf as G.

5. If A and B are on the second shelf, which one of the following must be true?
 - (A) D and E are on the top shelf.
 - (B) F is on the same shelf as H.
 - (C) A is directly above F.
 - (D) C is on the fourth shelf.
 - (E) C is on the first shelf.

- (C) If H is on the fourth shelf, then D and E are not on the second shelf.
- (D) If B is on the fourth shelf, then D is not on the third shelf.
- (E) If G is on the top shelf, then H is not on the bottom shelf.

Grid Game 2

An apartment building has five floors. Each floor has either one or two apartments. There are exactly eight apartments in the building. The residents of the building are J, K, L, M, N, O, P, and Q, who each live in a different apartment.

- J lives on a floor with two apartments.
- K lives on the floor directly above P.
- The second floor is made up of only one apartment.
- M and N live on the same floor.
- O does not live on the same floor as Q.
- L lives in the only apartment on her floor.
- Q does not live on the first or second floor.

6. Which one of the following must be true?
 - (A) Q lives on the third floor.
 - (B) Q lives on the fifth floor.
 - (C) L does not live on the fourth floor.
 - (D) N does not live on the second floor.
 - (E) J lives on the first floor.

7. Which one of the following CANNOT be true?
 - (A) K lives on the second floor.
 - (B) M lives on the first floor.
 - (C) N lives on the fourth floor.
 - (D) O lives on the third floor.
 - (E) P lives on the fifth floor.

8. If J lives on the fourth floor and K lives on the fifth floor, which one of the following can be true?
 - (A) O lives on the first floor.
 - (B) Q lives on the fourth floor.
 - (C) N lives on the fifth floor.
 - (D) L lives on the fourth floor.
 - (E) P lives on the third floor.

9. If O lives on the second floor, which one of the following CANNOT be true?
 - (A) K lives on the fourth floor.
 - (B) K lives on the fifth floor.
 - (C) L lives on the first floor.
 - (D) L lives on the third floor.
 - (E) L lives on the fourth floor.

10. If M lives on the fourth floor, which one of the following must be false?
 - (A) O lives on the fifth floor.
 - (B) J lives on the first floor.
 - (C) L lives on the second floor.
 - (D) Q lives on the third floor.
 - (E) P lives on the first floor.

11. Which one of the following must be true?
 - (A) If J lives on the fourth floor, then Q does not live on the fifth floor.
 - (B) If O lives on the second floor, then L does not live on the fourth floor.
 - (C) If N lives on the fourth floor, then K does not live on the second floor.
 - (D) If K lives on the third floor, then O does not live on the fifth floor.
 - (E) If P lives on the fourth floor, then M does not live on the third floor.

12. If O lives on the fourth floor and P lives on the second floor, which one of the following must be true?
 - (A) L lives on the first floor.
 - (B) M lives on the third floor.
 - (C) Q lives on the third floor.
 - (D) N lives on the fifth floor.
 - (E) Q lives on the fifth floor.

Grid Game 3

Dean Peterson, Head of the Math Department at Peabody Polytech, is making the fall teaching schedule. Besides himself, there are four other professors—Warren, Novak, Dornan, and Emerson. Their availability is subject to the following constraints.

Warren cannot teach on Monday or Thursday.

Dornan cannot teach on Wednesday.

Emerson cannot teach on Monday or Friday.

Associate Professor Novak can teach at any time.

Dean Peterson cannot teach evening classes.

Warren can teach only evening classes.

Dean Peterson cannot teach on Wednesday if Novak teaches on Thursday, and Novak teaches on Thursday if Dean Peterson cannot teach on Wednesday.

At any given time there are always three classes being taught.

13. At which one of the following times can Warren, Dornan, and Emerson all be teaching?
- (A) Monday morning
 - (B) Friday evening
 - (C) Tuesday evening
 - (D) Friday morning
 - (E) Wednesday morning
14. For which day will the dean have to hire a part-time teacher?
- (A) Monday
 - (B) Tuesday
 - (C) Wednesday
 - (D) Thursday
 - (E) Friday
15. Which one of the following must be false?
- (A) Dornan does not work on Tuesday.
 - (B) Emerson does not work on Tuesday morning.
 - (C) Peterson works on Tuesday.
 - (D) Novak works every day of the week except Wednesday.
 - (E) Dornan works every day of the week except Wednesday.
16. If Novak does not work on Thursday, then which one of the following must be true?
- (A) Peterson works Tuesday morning.
 - (B) Dornan works Tuesday morning.
 - (C) Emerson works Tuesday.
 - (D) Peterson works on Wednesday.
 - (E) Warren works Tuesday morning.

Grid Game 4

Doctor Yamata works only on Mondays, Tuesdays, Wednesdays, Fridays, and Saturdays. She performs four different activities—lecturing, operating, treating patients, and conducting research. Each working day she performs exactly one activity in the morning and exactly one activity in the afternoon. During each week her work schedule must satisfy the following restrictions:

She performs operations on exactly three mornings.

If she operates on Monday, she does not operate on Tuesday.

She lectures in the afternoon on exactly two consecutive calendar days.

She treats patients on exactly one morning and exactly three afternoons.

She conducts research on exactly one morning.

On Saturday she neither lectures nor performs operations.

17. Which one of the following must be a day on which Doctor Yamata lectures?
- (A) Monday
 - (B) Tuesday
 - (C) Wednesday
 - (D) Friday
 - (E) Saturday
18. On Wednesday Doctor Yamata could be scheduled to
- (A) conduct research in the morning and operate in the afternoon
 - (B) lecture in the morning and treat patients in the afternoon
 - (C) operate in the morning and lecture in the afternoon
 - (D) operate in the morning and conduct research in the afternoon
 - (E) treat patients in the morning and treat patients in the afternoon
19. Which one of the following statements must be true?
- (A) There is one day on which the doctor treats patients both in the morning and in the afternoon.
 - (B) The doctor conducts research on one of the days on which she lectures.
 - (C) The doctor conducts research on one of the days on which she treats patients.
 - (D) The doctor lectures on one of the days on which she treats patients.
 - (E) The doctor lectures on one of the days on which she operates.
20. If Doctor Yamata operates on Tuesday, then her schedule for treating patients could be
- (A) Monday morning, Monday afternoon, Friday morning, Friday afternoon
 - (B) Monday morning, Friday afternoon, Saturday morning, Saturday afternoon
 - (C) Monday afternoon, Wednesday morning, Wednesday afternoon, Saturday afternoon
 - (D) Wednesday morning, Wednesday afternoon, Friday afternoon, Saturday afternoon
 - (E) Wednesday afternoon, Friday afternoon, Saturday morning, Saturday afternoon
21. Which one of the following is a pair of days on both of which Doctor Yamata must treat patients?
- (A) Monday and Tuesday
 - (B) Monday and Saturday
 - (C) Tuesday and Friday
 - (D) Tuesday and Saturday
 - (E) Friday and Saturday