1. How many usernames contain the letter A?

```
SELECT COUNT(*) AS 'NumOfA'
FROM customer
WHERE username LIKE '%a%';
```

	NumOfA
	3

1 Row Returned

2. What is the average journey length, in seconds?

```
SELECT
  FORMAT(AVG(TIME_TO_SEC(endTime) - TIME_TO_SEC(startTime)),2)
  AS 'AVG_Length'
FROM journey;
```

	AVG_Length
	312.00

1 Row Returned

3. List the stations on the Eastern line (excluding City), in outbound order.

```
SELECT
  station.id,
  station.name
FROM station
WHERE station.line =
    (SELECT line.id FROM line
     WHERE line.name LIKE '%Eastern%')
ORDER BY station.sequence ASC;
```

	id	name
	9	Gallery
	10	Library
	11	Shops

3 Rows Returned

4. On which day of the week (Monday, Tuesday etc.) are the most journeys made?

```
SELECT
  DAYNAME(startTime) AS 'WeekDay',
  COUNT(DAYNAME(startTime)) AS 'MaxCount'
FROM journey
GROUP BY DAYNAME(startTime)
ORDER BY MaxCount DESC
LIMIT 1;
```

	WeekDay	MaxCount
	Thursday	9

1 Row Returned

5. List any stations at which no passenger has started or ended a journey. Show the station id and name.

```
SELECT
  station.id,
  station.name
FROM station
WHERE station.id NOT IN
    (SELECT journey.startStation FROM journey)
AND station.id NOT IN
    (SELECT journey.endStation FROM journey);
```

	id	name
	6	House

1 Row Returned

6. List the details of each journey, along with its cost.

```
SELECT
  journey.*,
  CASE
     WHEN (st1.zone = 1 AND st2.zone = 1 )
        OR (st1.zone = 2 AND st2.zone = 2 AND st1.line = st2.line)
        THEN 1
     WHEN (st1.zone = 2 AND st2.zone = 2 AND st1.line != st2.line)
        THEN 3
     ELSE 2
  END AS 'Cost'
FROM journey INNER JOIN station st1 INNER JOIN station st2
ON journey.startStation = st1.id
AND journey.endStation = st2.id;
```

id	customer	startStation	startTime	endStation	endTime	Cost
1	1	4	2018-02-01 01:01:00	3	2018-02-01 01:03:00	1
2	2	4	2018-02-01 02:02:00	2	2018-02-01 02:06:00	2
3	3	4	2018-02-01 03:03:00	1	2018-02-01 03:08:00	2
4	4	3	2018-02-01 04:04:00	2	2018-02-01 04:05:00	2
5	5	3	2018-02-01 05:05:00	1	2018-02-01 05:09:00	2
6	1	2	2018-02-01 06:06:00	1	2018-02-01 06:08:00	1
7	2	1	2018-02-01 07:07:00	11	2018-02-01 07:14:00	2
8	3	4	2018-02-01 08:08:00	9	2018-02-01 08:14:00	2
9	4	4	2018-02-01 09:09:00	10	2018-02-01 09:17:00	2
10	5	4	2018-02-02 10:10:00	11	2018-02-02 10:22:00	3

20 Rows Returned

7. List the station ids, along with the number of journeys that started or stopped at each station.

```
SELECT
  station.id,
  COUNT(*) AS 'NumberOfJourney'
FROM station INNER JOIN journey
ON station.id = journey.startStation
OR station.id = journey.endStation
GROUP BY station.id;
```

	id	NumberOfJourney
	1	6
	2	3
	3	3
	4	6
	5	1
	7	5
	8	9
	9	1
	10	2
	11	4

11 Rows Returned

8. List the journeys that ended at the last station on the line. (the station with the highest sequence number for a line)

```
SELECT
  journey.id,
  journey.endStation,
  station.line
FROM journey INNER JOIN station
ON journey.endStation = station.id
WHERE journey.endStation IN
  (SELECT id FROM station
  WHERE (line, sequence) IN
    (SELECT line, max(sequence)
    FROM station
    GROUP BY line))
AND journey.endStation != 1;
```

	id	endStation	line
	14	8	2
	15	8	2
	7	11	3
	10	11	3
	19	11	3
	20	11	3

6 Rows Returned

9. For each journey, show how many stations it passed through. (Count the end station but not the start station.)

```
SELECT
  journey.id,
  IF (st1.line = st2.line,
    ABS(CAST(st1.sequence AS SIGNED) - CAST(st2.sequence AS
SIGNED)),
    CAST(st1.sequence AS SIGNED) + CAST(st2.sequence AS SIGNED))
  AS 'PassStation'
FROM journey INNER JOIN station st1 INNER JOIN station st2
ON journey.endStation = st1.id
AND journey.startStation = st2.id;
```

	id	PassStation
	1	1
	2	2
	3	3
	4	1
	5	2
	6	1
	7	3
	8	4
	9	5
	10	6

20 Rows Returned

10. List the usernames of customers who have travelled on all lines.

```
SELECT customer.username
FROM customer INNER JOIN journey INNER JOIN station
ON customer.id = journey.customer
AND (journey.startStation = station.id
    OR journey.endStation = station.id)
WHERE line != 0
GROUP BY customer.id
HAVING COUNT(DISTINCT line) = (SELECT COUNT(*) FROM line);
```

	username
	alice
	bob
	carol
	dan

4 Rows Returned