Business Patterns and Seasonality

I am finding how many website sessions came in every hour of each week.

```
SELECT
    WEEK(created_at) AS wk,
    DATE(created_at) AS dt,
    WEEKDAY(created_at) AS wkday,
    HOUR(created_at) AS hr,
    COUNT(DISTINCT website_session_id) AS sessions
FROM website_sessions
WHERE website_session_id BETWEEN 10000 AND 115000
GROUP BY 1,2,3,4
LIMIT 5;
```

wk	dt	wkday	hr	sessions
0	2013-01-01	1	0	5
0	2013-01-01	1	1	3
0	2013-01-01	1	2	4
0	2013-01-01	1	3	1
0	2013-01-01	1	4	1

Analyzing Seasonality

Task:

2012 was a great year for us. As we continue to grow, we should take a look at 2012's monthly and weekly volume patterns, to see if we can find any seasonal trends we should plan for in 2013. If you can pull session volume and order volume, that would be excellent.

```sql
SELECT
    YEAR(ws.created_at) AS yr,
    MONTH(ws.created_at) AS mo,
    COUNT(DISTINCT ws.website_session_id) AS sessions,
    COUNT(DISTINCT o.order_id) AS orders
FROM website_sessions ws
LEFT JOIN orders o
ON ws.website_session_id = o.website_session_id
WHERE ws.created_at < '2013-01-01'
GROUP BY 1,2
```

yr	mo	sessions	orders
2012	3	1879	60
2012	4	3734	99
2012	5	3736	108
2012	6	3963	140
2012	7	4249	169
2012	8	6097	228
2012	9	6546	287
2012	10	8183	371
2012	11	14011	618
2012	12	10072	506

Analyzing Business Patterns

Task:

We're considering adding live chat support to the website to improve our customer experience. Could you analyze the average website session volume, by hour of day and by day week, so that we can staff appropriately? Let's avoid the holiday time period and use a date range of Sep 15 - Nov 15, 2013.

```sql
SELECT
    hr,
    ROUND(AVG(CASE WHEN wkday = 0 THEN website_sessions ELSE NULL END),1) AS mon,
    ROUND(AVG(CASE WHEN wkday = 1 THEN website_sessions ELSE NULL END),1) AS tue,
    ROUND(AVG(CASE WHEN wkday = 2 THEN website_sessions ELSE NULL END),1) AS wed,
    ROUND(AVG(CASE WHEN wkday = 3 THEN website_sessions ELSE NULL END),1) AS thu,
    ROUND(AVG(CASE WHEN wkday = 4 THEN website_sessions ELSE NULL END),1) AS fri,
    ROUND(AVG(CASE WHEN wkday = 5 THEN website_sessions ELSE NULL END),1) AS sat,
    ROUND(AVG(CASE WHEN wkday = 6 THEN website_sessions ELSE NULL END),1) AS sun
FROM(
SELECT
    DATE (created_at) AS created_date,
    WEEKDAY (created_at) AS wkday,
    HOUR (created_at) AS hr,
    COUNT(DISTINCT website_session_id) AS website_sessions
FROM website_sessions
WHERE created_at BETWEEN '2012-09-15' AND '2012-11-15' #before holiday surge
GROUP BY 1,2,3
) daily_hourly_sessions
GROUP BY hr;
```

hr	mon	tue	wed	thu	fri	sat	sun
0	8.7	7.7	6.3	7.4	6.8	5.0	5.0
1	6.6	6.7	5.3	4.9	7.1	5.0	3.0
2	6.1	4.4	4.4	6.1	4.6	3.7	3.0
3	5.7	4.0	4.7	4.6	3.6	3.9	3.4
4	5.9	6.3	6.0	4.0	6.1	2.8	2.4
5	5.0	5.4	5.1	5.4	4.6	4.3	3.9
6	5.4	5.6	4.8	6.0	6.8	4.0	2.6
7	7.3	7.8	7.4	10.6	7.0	5.7	4.8
8	12.3	12.2	13.0	16.5	10.5	4.3	4.1
9	17.6	15.7	19.6	19.3	17.5	7.6	6.0
10	18.4	17.7	21.0	18.4	19.0	8.3	6.3
11	18.0	19.1	24.9	21.6	20.9	7.2	7.7
12	21.1	23.3	22.8	24.1	19.0	8.6	6.1
13	17.8	23.0	20.8	20.6	21.6	8.1	8.4
14	17.9	21.6	22.3	18.5	19.5	8.7	6.7
15	21.6	17.1	25.3	23.5	21.3	6.9	7.1
17	19.4	15.9	20.2	19.8	12.9	6.4	7.6
18	12.7	15.0	14.8	15.3	10.9	5.3	6.8
19	12.4	14.1	13.3	11.6	14.3	7.1	6.4
20	12.1	12.4	14.2	10.6	10.3	5.7	8.4
21	9.1	12.6	11.4	9.4	7.3	5.7	10.2
22	9.1	10.0	9.8	12.1	6.0	5.7	10.2
23	8.8	8.6	9.6	10.6	7.6	5.3	8.3
16	21.1	23.7	23.7	19.6	20.9	7.6	6.6