CHAPTER 16: NUMBER FUNCTIONS

2023

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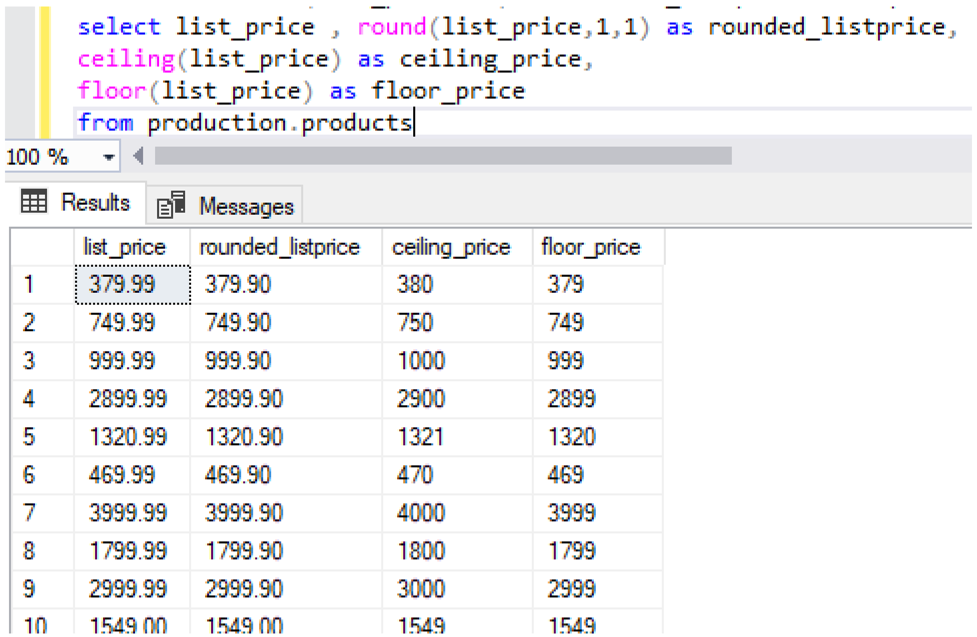
CEILING AND FLOOR ROUNDING

Floor() function returns the integer value less than or equal to the value passed in.

Ceiling() function on the other hand is the opposite. It returns the same data type as floor but returns the integer equal to or higher than the value passed in. See example below:



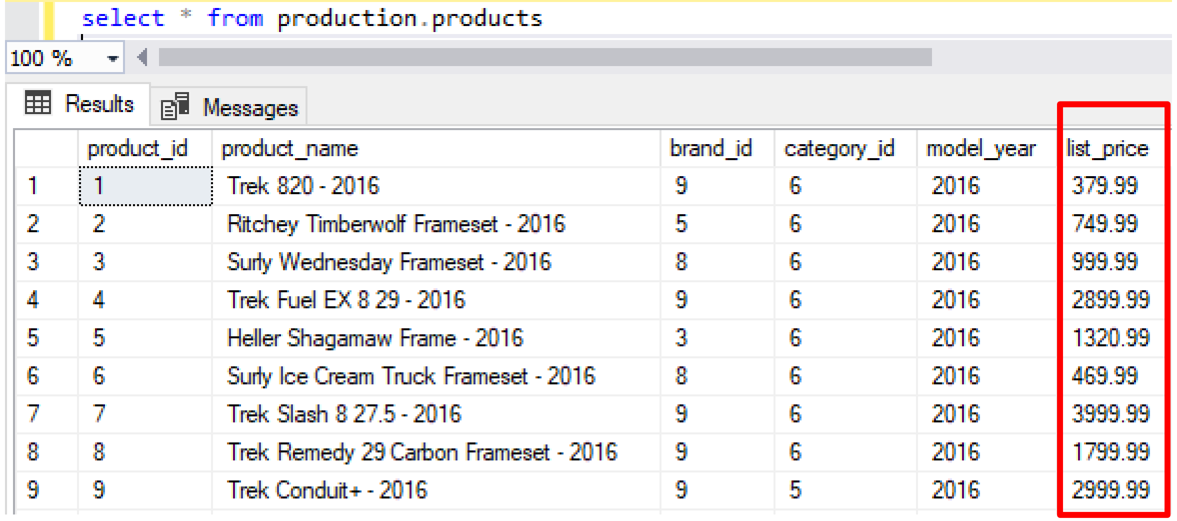
```
select list_price , round(list_price,1,1) as rounded_listprice,
ceiling(list_price) as ceiling_price,
floor(list_price) as floor_price
from production.products
```

	list_price	rounded_listprice	ceiling_price	floor_price
1	379.99	379.90	380	379
2	749.99	749.90	750	749
3	999.99	999.90	1000	999
4	2899.99	2899.90	2900	2899
5	1320.99	1320.90	1321	1320
6	469.99	469.90	470	469
7	3999.99	3999.90	4000	3999
8	1799.99	1799.90	1800	1799
9	2999.99	2999.90	3000	2999
10	1549.00	1549.00	1549	1549

ROUND

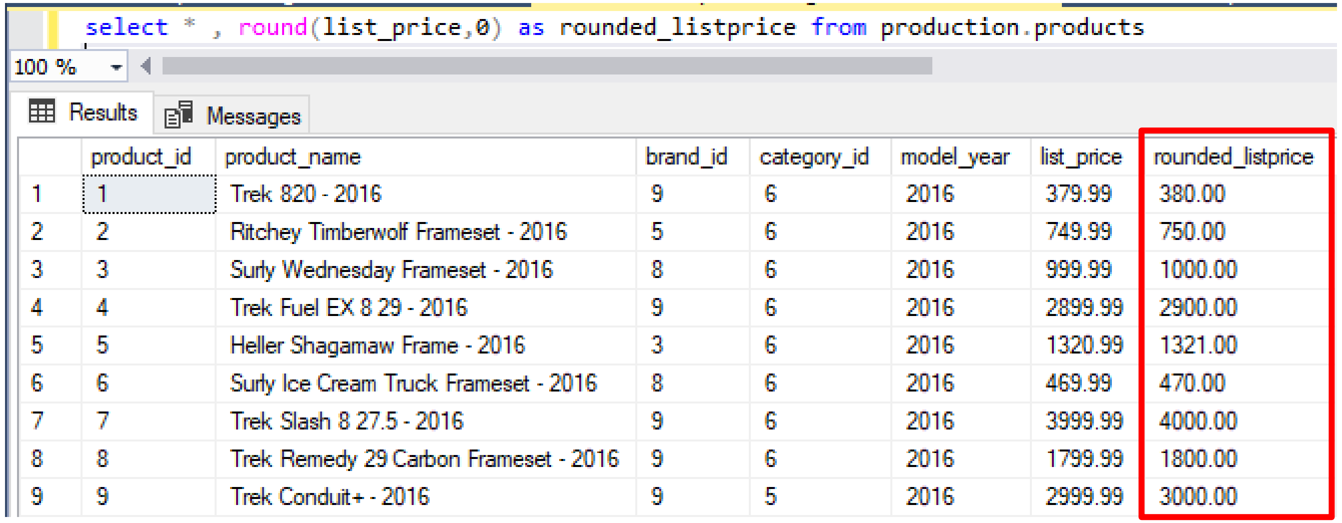
The ROUND() function rounds a number or value to a specific number of decimal places that you wish.

Example: It has been rounded to 0 decimal. Pay attention to the red highlighted blocks.



```
select * from production.products
```

	product_id	product_name	brand_id	category_id	model_year	list_price
1	1	Trek 820 - 2016	9	6	2016	379.99
2	2	Ritchey Timberwolf Frameset - 2016	5	6	2016	749.99
3	3	Surly Wednesday Frameset - 2016	8	6	2016	999.99
4	4	Trek Fuel EX 8 29 - 2016	9	6	2016	2899.99
5	5	Heller Shagamaw Frame - 2016	3	6	2016	1320.99
6	6	Surly Ice Cream Truck Frameset - 2016	8	6	2016	469.99
7	7	Trek Slash 8 27.5 - 2016	9	6	2016	3999.99
8	8	Trek Remedy 29 Carbon Frameset - 2016	9	6	2016	1799.99
9	9	Trek Conduit+ - 2016	9	5	2016	2999.99



```
select * , round(list_price,0) as rounded_listprice from production.products
```

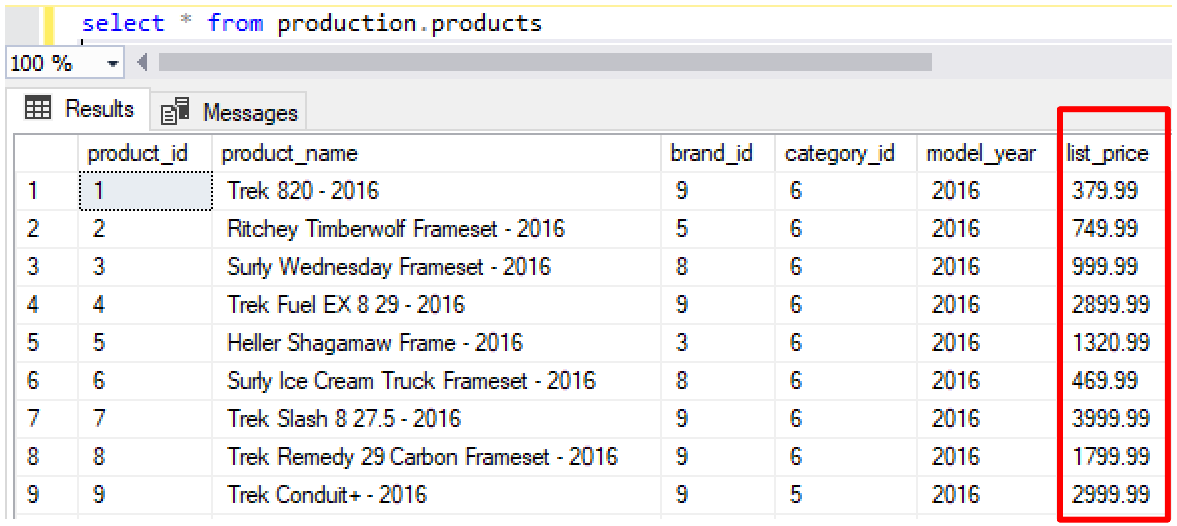
	product_id	product_name	brand_id	category_id	model_year	list_price	rounded_listprice
1	1	Trek 820 - 2016	9	6	2016	379.99	380.00
2	2	Ritchey Timberwolf Frameset - 2016	5	6	2016	749.99	750.00
3	3	Surly Wednesday Frameset - 2016	8	6	2016	999.99	1000.00
4	4	Trek Fuel EX 8 29 - 2016	9	6	2016	2899.99	2900.00
5	5	Heller Shagamaw Frame - 2016	3	6	2016	1320.99	1321.00
6	6	Surly Ice Cream Truck Frameset - 2016	8	6	2016	469.99	470.00
7	7	Trek Slash 8 27.5 - 2016	9	6	2016	3999.99	4000.00
8	8	Trek Remedy 29 Carbon Frameset - 2016	9	6	2016	1799.99	1800.00
9	9	Trek Conduit+ - 2016	9	5	2016	2999.99	3000.00

ROUND CONTINUED

Round(value -1) round the value to the nearest tens

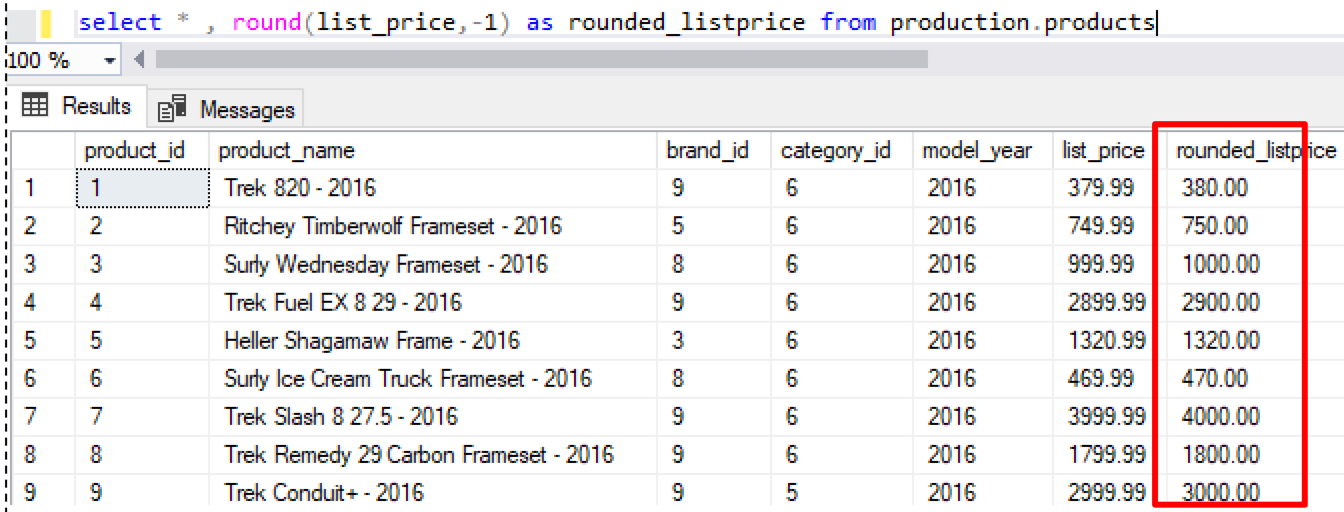
Round(value -2) round the value to the nearest hundreds

Round(value -3) round the value to the nearest thousands and you can move in that order.



```
select * from production.products
```

	product_id	product_name	brand_id	category_id	model_year	list_price
1	1	Trek 820 - 2016	9	6	2016	379.99
2	2	Ritchey Timberwolf Frameset - 2016	5	6	2016	749.99
3	3	Surly Wednesday Frameset - 2016	8	6	2016	999.99
4	4	Trek Fuel EX 8 29 - 2016	9	6	2016	2899.99
5	5	Heller Shagamaw Frame - 2016	3	6	2016	1320.99
6	6	Surly Ice Cream Truck Frameset - 2016	8	6	2016	469.99
7	7	Trek Slash 8 27.5 - 2016	9	6	2016	3999.99
8	8	Trek Remedy 29 Carbon Frameset - 2016	9	6	2016	1799.99
9	9	Trek Conduit+ - 2016	9	5	2016	2999.99



```
select * , round(list_price,-1) as rounded_listprice from production.products
```

	product_id	product_name	brand_id	category_id	model_year	list_price	rounded_listprice
1	1	Trek 820 - 2016	9	6	2016	379.99	380.00
2	2	Ritchey Timberwolf Frameset - 2016	5	6	2016	749.99	750.00
3	3	Surly Wednesday Frameset - 2016	8	6	2016	999.99	1000.00
4	4	Trek Fuel EX 8 29 - 2016	9	6	2016	2899.99	2900.00
5	5	Heller Shagamaw Frame - 2016	3	6	2016	1320.99	1320.00
6	6	Surly Ice Cream Truck Frameset - 2016	8	6	2016	469.99	470.00
7	7	Trek Slash 8 27.5 - 2016	9	6	2016	3999.99	4000.00
8	8	Trek Remedy 29 Carbon Frameset - 2016	9	6	2016	1799.99	1800.00
9	9	Trek Conduit+ - 2016	9	5	2016	2999.99	3000.00

CAST

The CAST() function returns the expression converted to the target data type.

The syntax:

```
CAST ( expression AS target_type[length])
```

In the above syntax:

1. The expression can be a literal value or a valid expression of any type that will be converted.

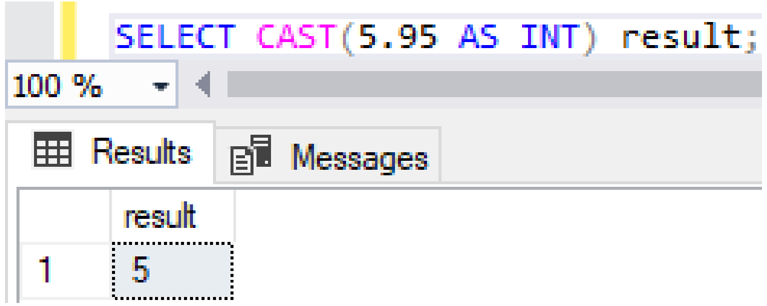
2. The target_type is the target data type to which you want to convert the expression.

Note that it cannot be an alias data type.

3. The length is an *optional* integer that specifies the length of the target type, eg varchar(*20*).

The length defaults to 30.

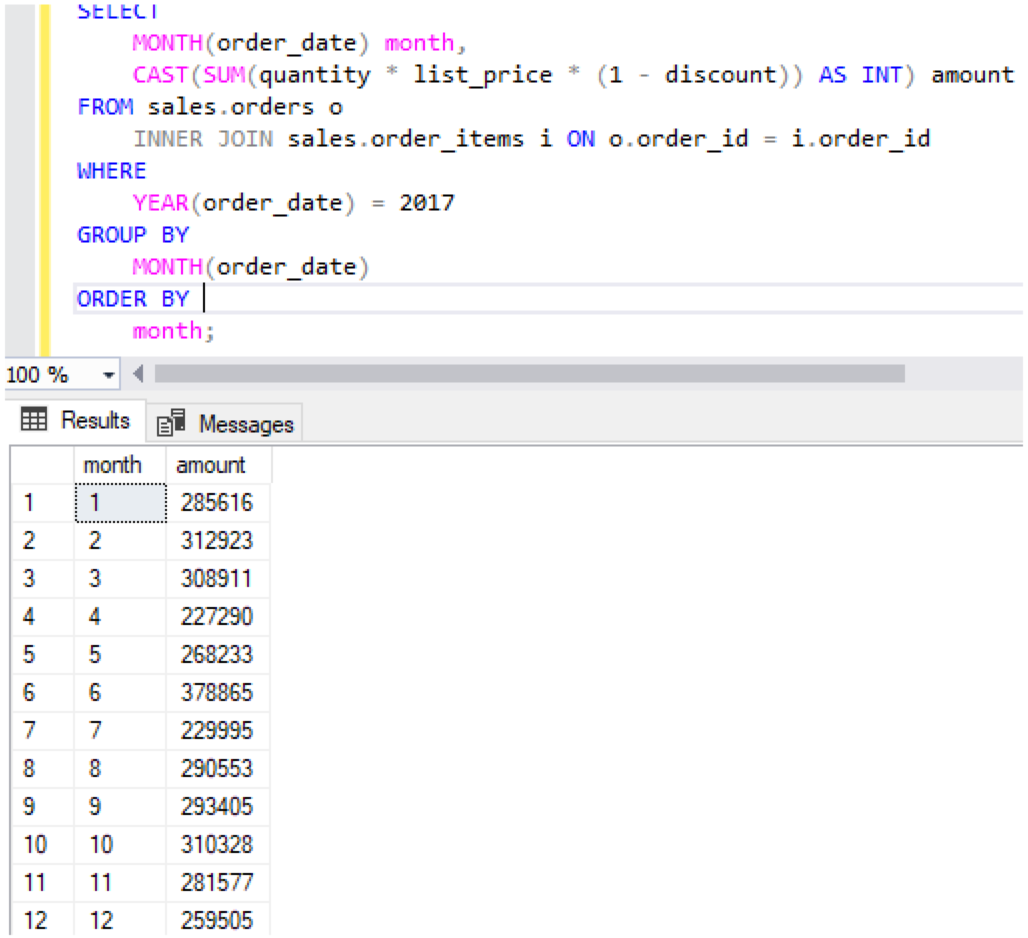
CAST EXAMPLE



```sql
SELECT CAST(5.95 AS INT) result;
```

	result
1	5

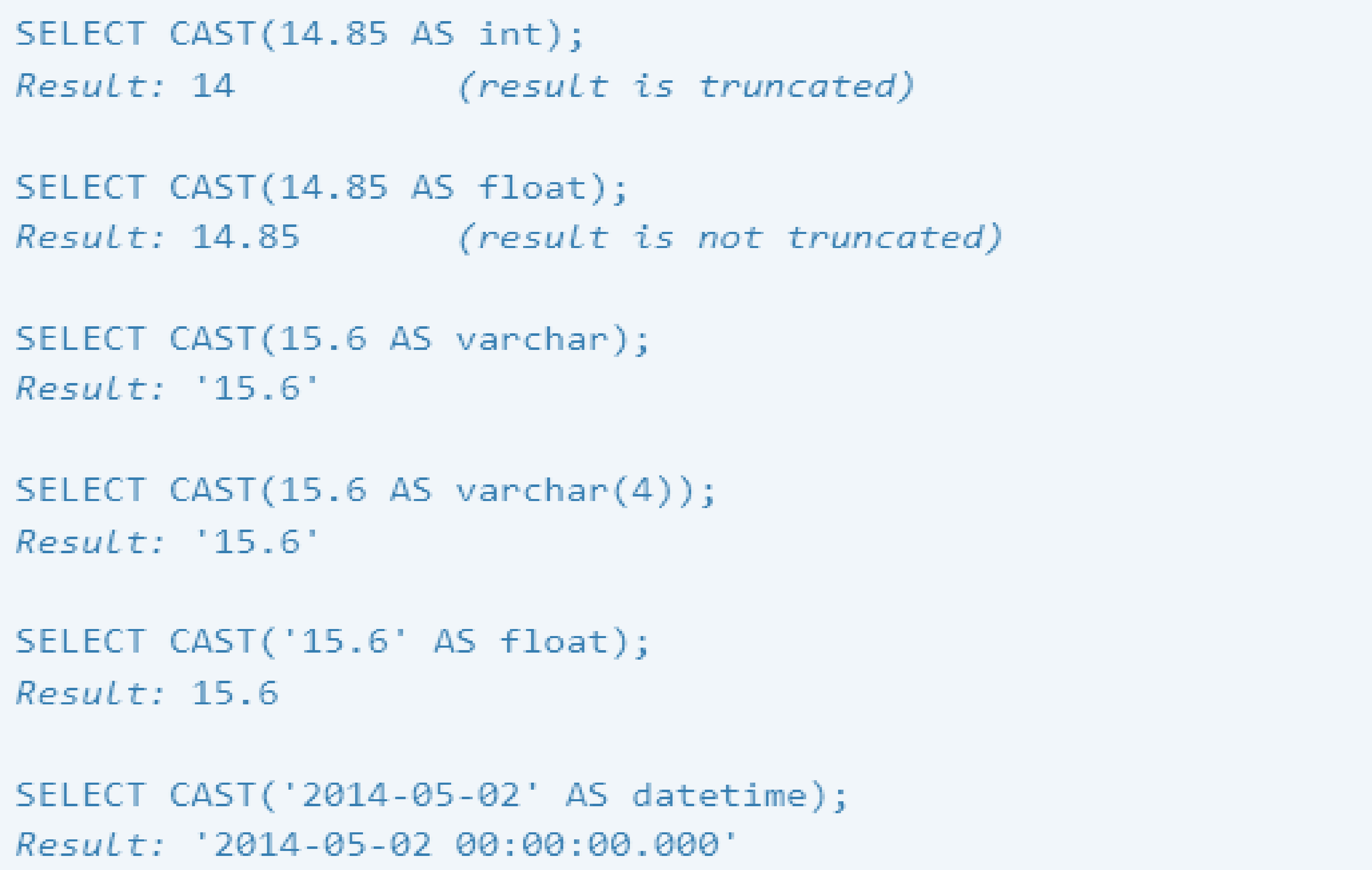
CAST() function to convert the monthly sales in 2017 to integer values.



```sql
SELECT
    MONTH(order_date) month,
    CAST(SUM(quantity * list_price * (1 - discount)) AS INT) amount
FROM sales.orders o
    INNER JOIN sales.order_items i ON o.order_id = i.order_id
WHERE
    YEAR(order_date) = 2017
GROUP BY
    MONTH(order_date)
ORDER BY
    month;
```

	month	amount
1	1	285616
2	2	312923
3	3	308911
4	4	227290
5	5	268233
6	6	378865
7	7	229995
8	8	290553
9	9	293405
10	10	310328
11	11	281577
12	12	259505

CAST EXAMPLES



```
SELECT CAST(14.85 AS int);
Result: 14          (result is truncated)

SELECT CAST(14.85 AS float);
Result: 14.85       (result is not truncated)

SELECT CAST(15.6 AS varchar);
Result: '15.6'

SELECT CAST(15.6 AS varchar(4));
Result: '15.6'

SELECT CAST('15.6' AS float);
Result: 15.6

SELECT CAST('2014-05-02' AS datetime);
Result: '2014-05-02 00:00:00.000'
```

Practice

ROUND / CEILING / FLOOR … FUNCTIONS

1. Show the product name and the buy price and show the buy price in 2 decimal places
2. Calculate the precise amount of each customer to the closest digit.
3. Assuming that the customers were only using hundred-rand bank notes determine how much each customer paid.
4. Show the average payment for each month in 2003 and round down to the nearest specified place