FUNCTIONS I: MATH & STRING

METIS

Math Functions

Question:
To the nearest percent, what is the percent markup for each item?

Inventory Table

name	vendor_unit_price
tiger t-shirt	4.2500
giraffe-print bag	24.9900
elephant tie	13.1900
zebra-striped pants	16.8800
peacock feather hat	NULL
leopard-print scarf	8.5500
walrus-shaped pillow	12.2500
gazelle lamp	38.8500
bedding set, tiger icons	31.9900
wooly mammoth curtains	29.9900
manatee tank top	3.5000
bow tie, ants marching	12.2900

Item Details Table

name	sales_price
tiger t-shirt	9.9900
giraffe-print bag	49.9900
elephant tie	35.4900
zebra-striped pants	30.9900
peacock feather hat	34.9900
leopard-print scarf	14.4900
gazelle lamp	79.9900
bedding set, tiger icons	69.9900
aardvark earrings	9.9900

Math Functions

Question:
To the nearest percent, what is the percent markup for each item?

```
SELECT a.name, a.vendor_unit_price, b.sales_price
   CAST( ROUND(
      100*(b.sales_price - a.vendor_unit_price)/b.sales_price, 0)
      AS INT) AS markup_perc
    FROM inventory AS a
    JOIN item_details AS b
    ON a.id = b.item_id
    ORDER BY markup_perc DESC;
```

Standard math operators and special functions like ROUND(x, d) are permitted

Math Functions

Question:
To the nearest percent, what is the percent markup for each item?

name	vendor_unit_price	sales_price	markup_perc
elephant tie	13.1900	35.4900	169
tiger t-shirt	4.2500	9.9900	135
bedding set, tiger icons	31.9900	69.9900	119
gazelle lamp	38.8500	79.9900	106
giraffe-print bag	24.9900	49.9900	100
zebra-striped pants	16.8800	30.9900	84
leopard-print scarf	8.5500	14.4900	69
peacock feather hat	NULL	34.9900	NULL

- **Column rounded to nearest percent**
- **Displayed as integer**
- **Descending**
- **NULL values where calculation not possible**

Math Functions List

ABS
ACOS
ASIN
ATAN
ATN2
CEILING
COS
COT
DEGREES
EXP
FLOOR
LOG
LOG10
PI
POWER
RADIANS
RAND
ROUND
SIGN
SIN
SQRT
SQUARE
TAN

Math Functions

Distances Table

id	item	length_inches
1	paperclip	1.375
2	pencil	7.5
3	phone charger cord	42

Question:
Using these lengths as the diameter, what are the circumference, area, and volume of the resulting circles/spheres?

Circumference $= \pi d$

Area $= \pi r^2$

Volume $= \frac{4}{3}\pi r^3$

where d is the diameter and r is the radius $(r = \mathrm{d}/2)$

Math Functions

Question:
Using these lengths as the diameter, what are the circumference, area, and volume of the resulting circles/spheres?

```
SELECT item, length_inches,
    PI()*length_inches AS circumference,
    PI()*POWER((length_inches/2), 2) AS area,
    4*PI()*POWER((length_inches/2), 3)/3 AS volume
    FROM measurements;
```

item	length_inches	circumference	area	volume
paperclip	1.375	4.31968989868597	1.4848934026733	1.36115228578386
pencil	7.5	23.5619449019234	44.1786466911065	220.893233455532
phone charger cord	42	131.946891450771	1385.4423602331	38792.3860865268

String Functions

What is a string?

- A ”string” refers to data that contains words and text
- Can also contain numbers, but stores them as characters (no math capability): this is useful for phone numbers, SSNs, etc
- Store strings in VARCHAR or TEXT data types and enclose data with single quotes (e.g. ‘tiger t-shirt’, ‘HDTV, 40 inch’)
- Strings can also be manipulated with SQL functions just like numerical values

String Functions

Capitalization

LOWER(‘Example TEXT!’) → ‘example text!’

UPPER(‘Example TEXT!’) → ‘EXAMPLE TEXT!’

Concatenation

CONCAT(‘Miss’, ‘Mary’, ‘Malone’) → ‘MissMaryMalone’

CONCAT(‘Miss’, ‘ ‘, ‘Mary’, ‘ ‘, ‘Malone’) → ‘Miss Mary Malone’

CONCAT_WS(‘--‘, ‘Miss’, ‘Mary’, ‘Malone’) → ‘Miss--Mary--Malone’

‘Miss’ + ‘ ‘ + ‘Mary’ + ‘ ‘ + ‘Malone’ → ‘Miss Mary Malone’

String Functions

Character Count

LEN(‘Example TEXT!’) → 13

Replace Substring

REPLACE(‘Classroom projecter’ ‘projecter’, ‘projector’) → ‘Classroom projector’

REPLACE(‘Example TEXT!’, ‘!’, ‘’) → ‘Example TEXT’

Remove leading and trailing whitespace

TRIM(‘ removable spacing ’) → ‘removable spacing’

String Functions

Students Table

id	first_name	last_name	test_grade
1	Peter	Pan	81
2	Wendy	Darling	93
3	Captain	Hook	59
4	Mr.	Smee	42
5	Tinker	Bell	76

Question:
Print off a list of student results for recent test in the form of:

LAST NAME, FIRST NAME and PASS/FAIL

where passing grade is 60 or above.

String Functions

Question:
Print off list of students results in the form of LAST NAME, FIRST NAME and PASS/FAIL

```
SELECT UPPER(last_name) + ', ' + UPPER(first_name) AS full_name,
    CASE
      WHEN test_grade >= 60 THEN 'PASS'
      ELSE 'FAIL'
      END AS test_result
   FROM students ORDER BY last_name;
```

full_name	test_result
BELL, TINKER	PASS
DARLING, WENDY	PASS
HOOK, CAPTAIN	FAIL
PAN, PETER	PASS
SMEE, MR.	FAIL