Q1)

solution:

a.

| t(hours) | BAC |
|---|---|
| 0 | 0 |
| 0.2 | 0.25 |
| 0.5 | 0.41 |
| 0.75 | 0.4 |
| 1 | 0.33 |
| 1.25 | 0.29 |
| 1.5 | 0.24 |
| 1.75 | 0.22 |
| 2 | 0.18 |
| 2.25 | 0.15 |
| 2.5 | 0.12 |
| 3 | 0.07 |
| 3.5 | 0.03 |
| 4 | 0.01 |



Answer of 01 (a)
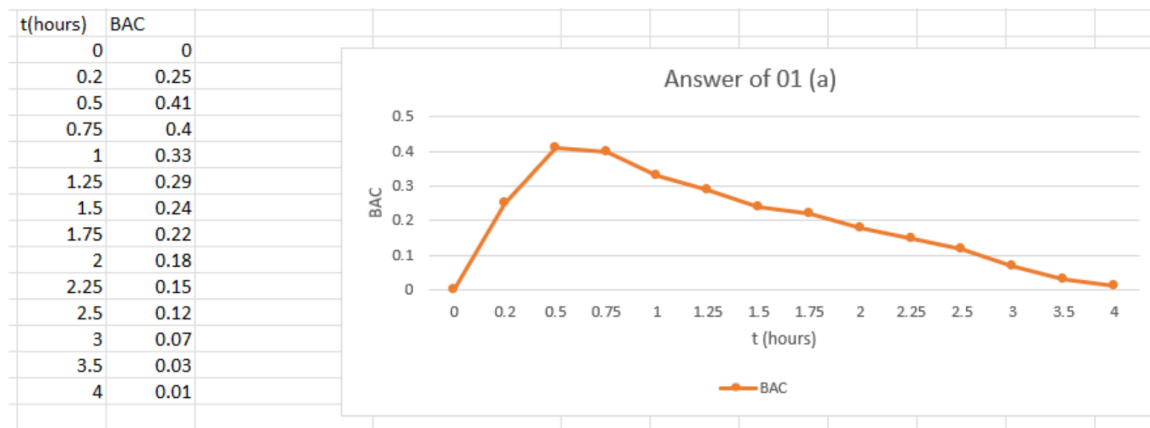
b.

Based on the data given on the question, initially, when t=0 hours the BAC is 0 mg/mL as time has elapsed after consumption.As time passed, the BAC started increasing and after reaching 0.5 hours, it started decreasing very
slowly. The BAC peaks between 0.5 and 1.5 hours later, with readings between 0.4 mg/mL and 0.3 mg/mL. The BAC starts to steadily decline after peaking. Comparing the rate of decrease to the initial increase, it seems to be slower. At 3 hours, 0.03 hours, and 4 hours, the BAC significantly drops to 0.01 mg/mL, 0.07 mg/mL, and 0.03 mg/mL, respectively.

In summary, after consuming alcohol rapidly, the BAC initially rises quickly, peaks at 0.41 mg/mL within half an hour, and then gradually decreases. The absorption rate slows down, leading to a slower decline in BAC over time until it reaches a negligible level after approximately 4 hours.

Q2)

solution:

Given, the equation is
$$x^2 + (y - 2)^4 = 4$$
By rearranging the equation, we get,

$$(y - 2)^4 = 4 - x^2$$
$$(y - 2) = \pm \sqrt[4]{4 - x^2}$$

$$y = 2 \pm \sqrt[4]{4 - x^2}$$
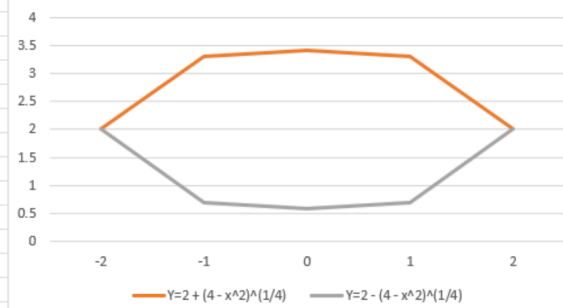
We know,

$$y = 2 + \sqrt[4]{4 - x^2}$$

OR

$$y = 2 - \sqrt[4]{4 - x^2}$$

ANSWER OF 2

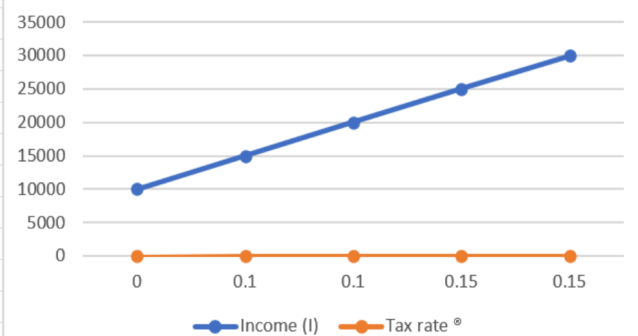| X | Y=2 + (4 - x^2)^(1/4) | Y=2 - (4 - x^2)^(1/4) |
|---|---|---|
| -2 | 2 | 2 |
| -1 | 3.316074013 | 0.683925987 |
| 0 | 3.414213562 | 0.585786438 |
| 1 | 3.316074013 | 0.683925987 |
| 2 | 2 | 2 |



Answer of 02

Q3)

solution:

a. Tax rate(R): =IF(x <= 10000, 0%, IF(x <= 20000, 10%, 15%)), Income= I

03 a)

| Income (I) | Tax rate ® |
|---|---|
| 5000 | 0 |
| 10,000 | 0 |
| 15000 | 0.1 |
| 20,000 | 0.1 |
| 25000 | 0.15 |
| 30,000 | 0.15 |



Chart Title

b. How much tax is assessed on an income of $14,000? On $26,000?

**ANSWER:**

For the tax of $14,000:
First, there is no tax on income up to $10,000 but any income over $10,000 is taxed at a rate of 10%.
Tax for $14,000: (Income - Threshold) * Tax Rate
($14,000 - $10,000) * 10%
$4,000 * 0.10
$400

Tax for $26,000:

First, there is no tax on income up to $10,000 but any income over $10,000 is taxed at a rate of 10%. Any income over $20,000 is taxed at a rate of 15%.
Tax = (Income - $20,000) * (Tax Rate for $20,000) + ($20,000 - $10,000) * (Tax Rate for $10,000)
= ($26,000 - $20,000) * 15% + ($20,000 - $10,000) * 10%
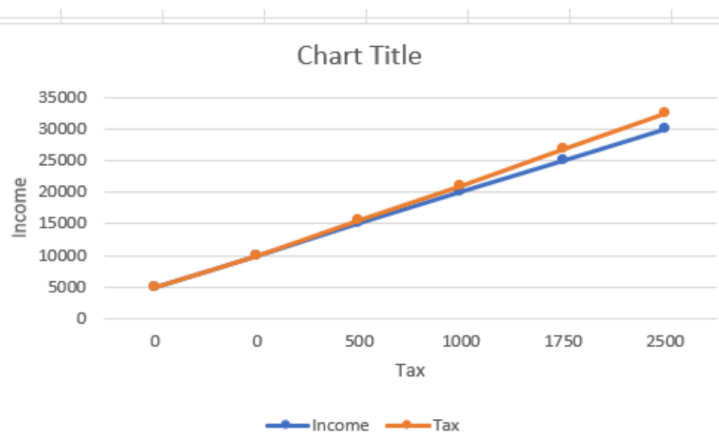= $6,000 * 0.15 + $10,000 * 0.10
= $900 + $1,000
= $1,900

So, the tax assessed on an income of $26,000 is $1,900.

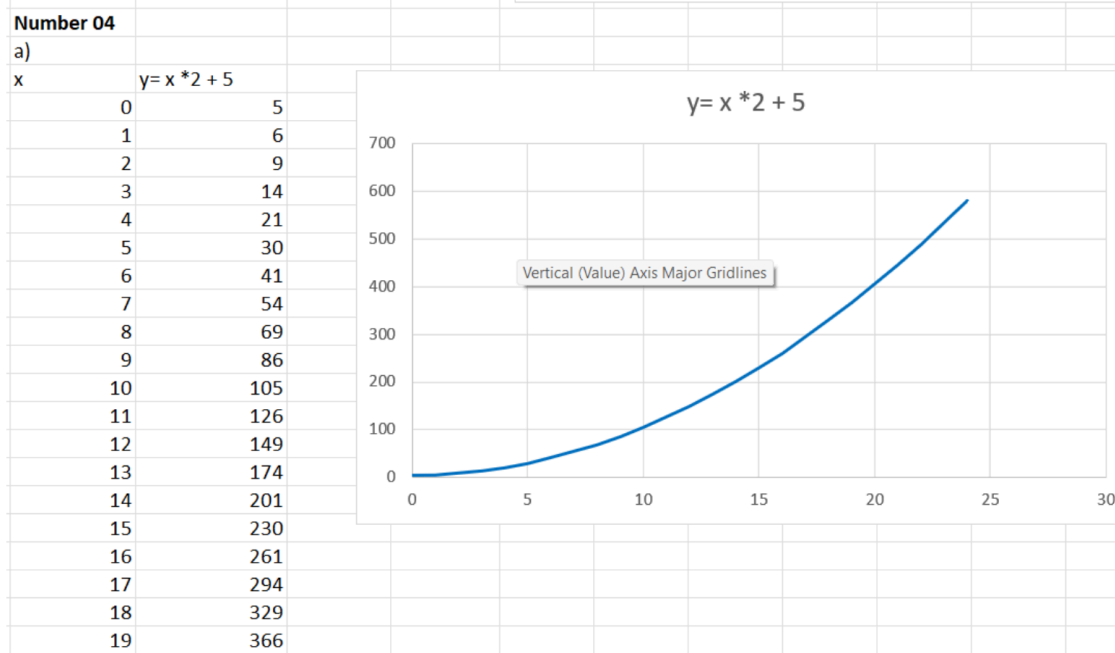**c)** Tax= IF(I <= 10000, 0, IF(I <= 20000, (I - 10000) * 0.1, 10000 * 0.1 + (I - 20000) * 0.15)) [I=Income]

| c) | |
|---|---|
| Income | Tax |
| 5000 | 0 |
| 10,000 | 0 |
| 15000 | 500 |
| 20,000 | 1000 |
| 25000 | 1750 |
| 30,000 | 2500 |



Chart Title

4.

solution:

a)

**Number 04**
a)

| x | y= x *2 + 5 |
|---|---|
| 0 | 5 |
| 1 | 6 |
| 2 | 9 |
| 3 | 14 |
| 4 | 21 |
| 5 | 30 |
| 6 | 41 |
| 7 | 54 |
| 8 | 69 |
| 9 | 86 |
| 10 | 105 |
| 11 | 126 |
| 12 | 149 |
| 13 | 174 |
| 14 | 201 |
| 15 | 230 |
| 16 | 261 |
| 17 | 294 |
| 18 | 329 |
| 19 | 366 |

y= x *2 + 5

Vertical (Value) Axis Major Gridlines

b)

b)

| x | y = x^ (-1) |
|---|---|
| 1 | 1 |
| 2 | 0.5 |
| 3 | 0.333333333 |
| 4 | 0.25 |
| 5 | 0.2 |
| 6 | 0.166666667 |
| 7 | 0.142857143 |
| 8 | 0.125 |
| 9 | 0.111111111 |
| 10 | 0.1 |
| 11 | 0.090909091 |
| 12 | 0.083333333 |
| 13 | 0.076923077 |
| 14 | 0.071428571 |
| 15 | 0.066666667 |
| 16 | 0.0625 |
| 17 | 0.058823529 |
| 18 | 0.055555556 |
| 19 | 0.052631579 |
| 20 | 0.05 |
| 21 | 0.047619048 |

y = x^ (-1)

5.
solution:

**05 a)**

| Femur length(cm) | Height(cm) |
|---|---|
| 50.1 | 178.5 |
| 48.3 | 173.6 |
| 45.2 | 164.8 |
| 44.7 | 163.7 |
| 44.5 | 168.3 |
| 42.7 | 165 |
| 39.5 | 155.4 |
| 38 | 155.8 |



**b)**

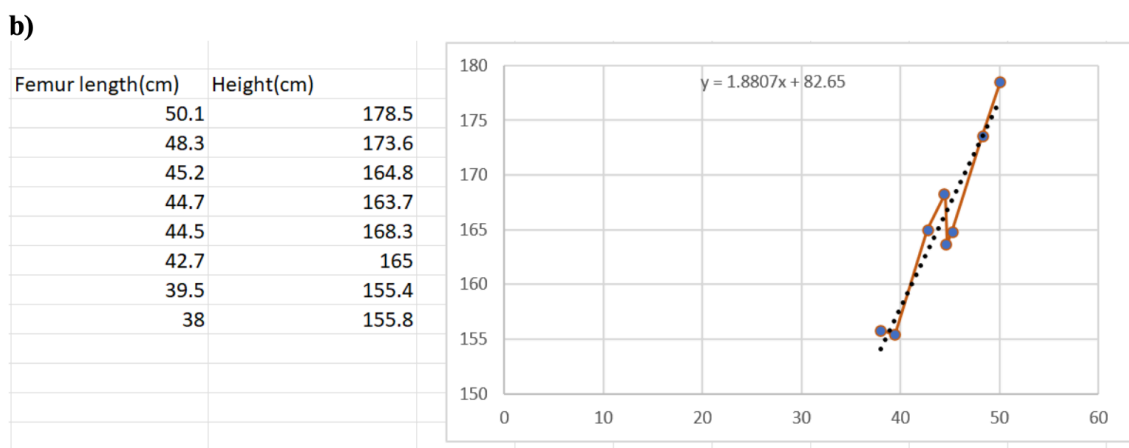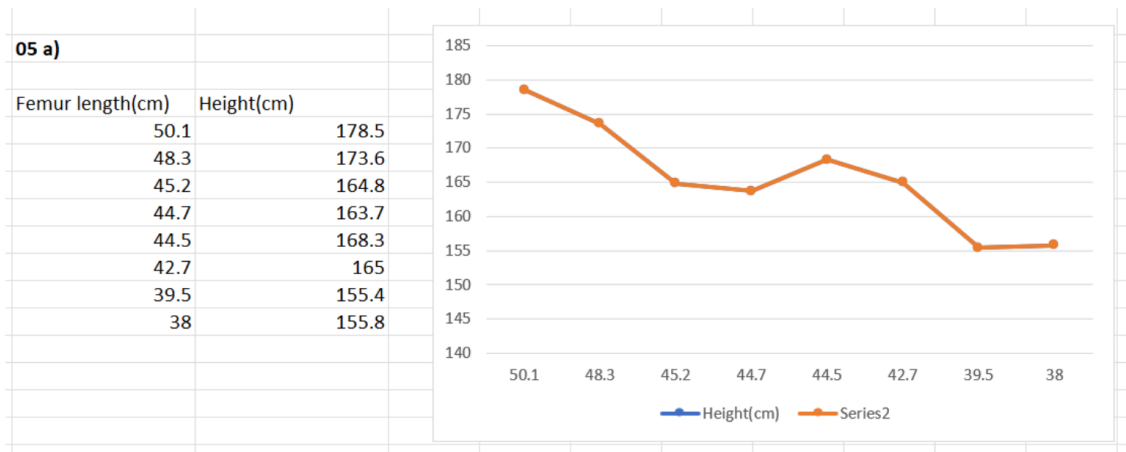| Femur length(cm) | Height(cm) |
|---|---|
| 50.1 | 178.5 |
| 48.3 | 173.6 |
| 45.2 | 164.8 |
| 44.7 | 163.7 |
| 44.5 | 168.3 |
| 42.7 | 165 |
| 39.5 | 155.4 |
| 38 | 155.8 |



c)

Considering the given equation:
$y = 1.8807x + 82.65$,
Here, y represents the height and x represents the femur length.

Given that the femur length (x) is 53 cm, we can substitute this value into the equation to find the corresponding height (y).

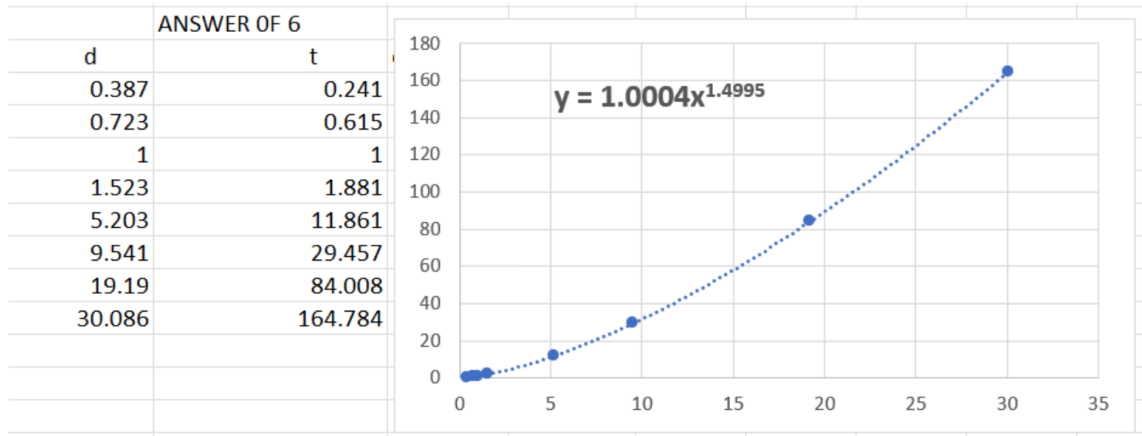We know, x = 53,

$y = 1.8807 * 53 + 82.65$
$y = 99.7871 + 82.65$
$y = 182.3271$ cm

Therefore, the person's height is approximately 182.32 cm

6.

Solution:

a.

| ANSWER OF 6 | |
| --- | --- |
| d | t |
| 0.387 | 0.241 |
| 0.723 | 0.615 |
| 1 | 1 |
| 1.523 | 1.881 |
| 5.203 | 11.861 |
| 9.541 | 29.457 |
| 19.19 | 84.008 |
| 30.086 | 164.784 |

$y = 1.0004x^{1.4995}$
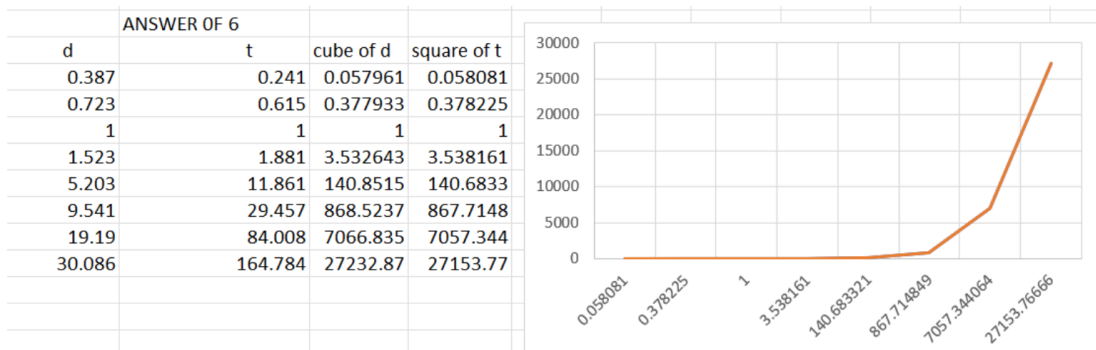
b.

So, from Excel, we can see that the value of cube of d = square of t is almost same. So, Kepler's third law is proven $y^2 \propto x^3$

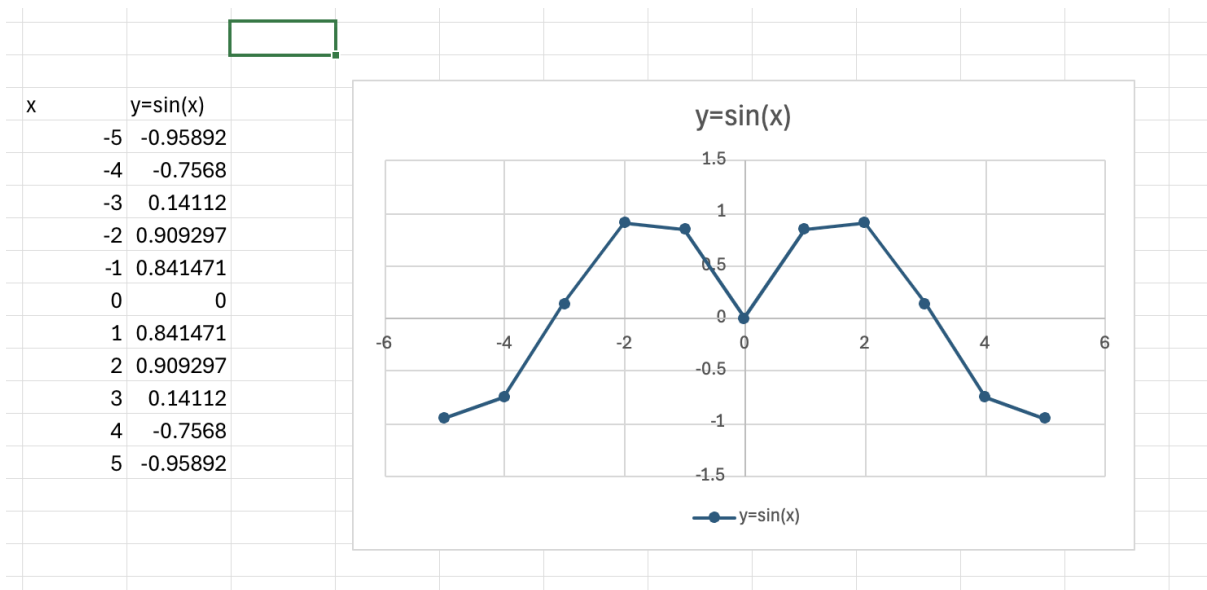| ANSWER OF 6 | | | |
| --- | --- | --- | --- |
| d | t | cube of d | square of t |
| 0.387 | 0.241 | 0.057961 | 0.058081 |
| 0.723 | 0.615 | 0.377933 | 0.378225 |
| 1 | 1 | 1 | 1 |
| 1.523 | 1.881 | 3.532643 | 3.538161 |
| 5.203 | 11.861 | 140.8515 | 140.6833 |
| 9.541 | 29.457 | 868.5237 | 867.7148 |
| 19.19 | 84.008 | 7066.835 | 7057.344 |
| 30.086 | 164.784 | 27232.87 | 27153.77 |

c.
The power law is found in the graph: y = 1.0004 (x) ^1.4995 by using Excel.
This law collaborates with Kepler's third law $y^2 \propto x^3$

7.
a

| x | y=sin(x) |
|---|---|
| -5 | -0.95892 |
| -4 | -0.7568 |
| -3 | 0.14112 |
| -2 | 0.909297 |
| -1 | 0.841471 |
| 0 | 0 |
| 1 | 0.841471 |
| 2 | 0.909297 |
| 3 | 0.14112 |
| 4 | -0.7568 |
| 5 | -0.95892 |



y=sin(x)

b) y=√(|x|)

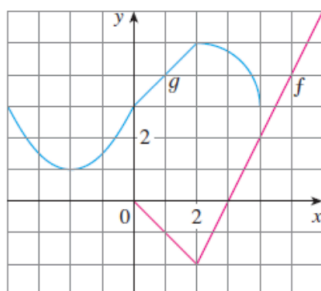| x | y=√(|x|) |
|---|---|
| -5 | 2.236068 |
| -4 | 2 |
| -3 | 1.732051 |
| -2 | 1.414214 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 1.414214 |
| 3 | 1.732051 |
| 4 | 2 |
| 5 | 2.236068 |



y=√(|x|)
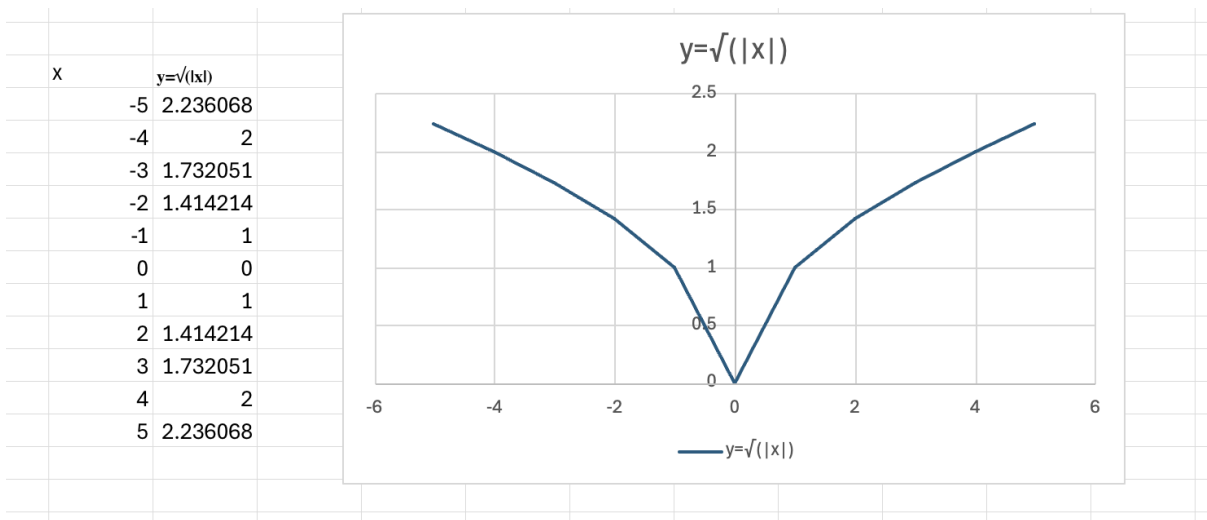
8. Use the given graphs of $f$ and $g$ to evaluate each expression or explain why it is undefined.
   a. $(g \circ f)(6)$          b. $(g \circ g)(-2)$          c. $(f \circ f)(4)$

SOLUTION:

a. $(g \circ f)(6) = g(f(6)) = g(6)$ It is undefined because g is not defined at 6.

b. $(g \circ g)(-2) = g(g(-2)) = g(1) = 4$

c. $(f \circ f)(4) = f(f(4)) = f(2) = -2$