

QAP 2 – Essentials

Group - 11

Project 2 – Math – Complete the following.

1. Simplify using BEDMAS $9 + (12 \div 6)^2 + (2 \times -9) - 5$

$$= 9 + (2)^2 + (-18) - 5$$

$$= 9 + 4 - 18 - 5$$

$$= -10$$

2. Simplify using BEDMAS $\frac{28+7}{-7(5-6)^2} - 1$

$$= \frac{35}{-7(-1)^2} - 1$$

$$= \left(\frac{35}{-7}\right) - 1$$

$$= -5 - 1$$

$$= -6$$

3. Simplify using BEDMAS $((4 + 3) \times 4) - 5 + \left(\frac{(7-4)^2}{3}\right) + 1$

$$= (7 \times 4) - 5 + \left(\frac{3^2}{3}\right) + 1$$

$$= 28 - 5 + \left(\frac{9}{3}\right) + 1$$

$$= 23 + 3 + 1$$

$$= 27$$

4. Calculate each: $38.63 + 14.2 =$ $230 \times 2.465 =$ $\frac{13.2}{4.8} =$

$$38.63 + 14.2 = 52.83$$

$$230 \times 2.465 = 566.95$$

$$\frac{13.2}{4.8} = 2.75$$

5. Solve for the subject in (): $Y = mx + c$ (m)

Subtracting c from both sides

$$Y - c = mx + c - c$$

Simplifying

$$Y - c = mx$$

Dividing both sides by x

$$\frac{Y - c}{x} = \frac{mx}{x}$$

Simplifying

$$\frac{Y - c}{x} = m$$

6. Solve for the subject in (): $\frac{y}{p} + a = b$ (P)

Subtracting a from both sides

$$\frac{y}{p} + a - a = b - a$$

Simplifying

$$\frac{y}{p} = b - a$$

Reciprocating

$$\frac{p}{y} = \frac{1}{(b - a)}$$

Multiplying both sides by y

$$y\left(\frac{P}{y}\right) = y\frac{1}{(b-a)}$$

Simplifying

$$P = \frac{y}{b-a}$$

7. **Solve for the subject in (): $2(x + 3) - 3(y + 2) = 4xy$ (x)**

Expanding brackets

$$2x + 6 - 3y - 6 = 4xy$$

Simplifying

$$2x - 3y = 4xy$$

Subtracting $4xy$ from both sides

$$\begin{aligned} 2x - 3y - 4xy &= 4xy - 4xy \\ 2x - 3y - 4xy &= 0 \end{aligned}$$

Adding $3y$ to both sides

$$\begin{aligned} 2x - 3y + 3y &= 0 + 3y \\ 2x - 4xy &= 3y \end{aligned}$$

Factorizing

$$2x(1 - 2y) = 3y$$

Dividing both sides by $(1 - 2y)$

$$\frac{2x(1 - 2y)}{(1 - 2y)} = \frac{3y}{(1 - 2y)}$$

Simplifying

$$2x = \frac{3y}{1 - 2y}$$

Dividing both sides by 2

$$\frac{2x}{2} = \frac{3y}{2(1 - 2y)}$$

Simplifying

$$x = \frac{3y}{2(1 - 2y)}$$

8. Solve for the subject in (): $S = uf + \frac{1}{2}at^2$ (t)

$$S - uf = \frac{1}{2}(at^2)$$

$$\frac{1}{2}(at^2) = S - uf$$

$$at^2 = 2(S - uf)$$

$$t^2 = \frac{2(S - uf)}{a}$$

$$t = \sqrt{\frac{2(S - uf)}{a}}$$

9. A student worked 3.5 hours on Friday evening, 5 hours on Saturday and 6.5 hours on Sunday. How much will they earn if they are paid \$12.50 per hour?

Data:

$$\text{Hourly payment} = \$12.50$$

$$\text{Hours worked on Friday} = 3.5$$

$$\text{Hours worked on Saturday} = 5$$

$$\text{Hours worked on Sunday} = 6.5$$

Solution:

$$\text{Total working hours} = 3.5 + 5 + 6.5$$

$$\text{Total working hours} = 15$$

$$\text{Total earning} = \text{Total working hours} \times \text{Hourly payment}$$

$$\text{Total earning} = 15 \times 12.50$$

$$\text{Total earning} = \$187.50$$

10. George purchased 5.5 yards of brown upholstery material, and 7.75 yards of maroon material. If he used 3.25 yards on a project, how much material does he have left?

*Total material = 5.5 yards (brown upholstery) +
7.7 yards (maroon material)*

$$\begin{aligned} \text{Total material} &= 13.25 \text{ yards} \\ \text{Remaining material} &= 13.25 - 3.25 \\ \text{Remaining material} &= 10 \text{ yards} \end{aligned}$$

11. The Miller family estimate that they spend \$475 a month on food. This amount represents 12% of their total budget. What is the amount of their total budget?

Monthly spending on food = \$ 475

Let their total budget be ' x '

Hence,

$$12\% \times x = 475$$

Converting the sign of percentage to the fraction

$$\frac{12}{100} x = 475$$

Multiplying both sides by 100

$$\frac{12x \times 100}{100} = 475 \times 100$$

Simplifying

$$12x = 475 \times 100$$

Dividing both sides by 12

$$\frac{12x}{12} = \frac{47500}{12}$$

Simplifying

$$\begin{aligned} x &= \frac{47500}{12} \\ x &= \$ 3958.33 \end{aligned}$$

Rounding it off to the nearest \$10

$$x = \$ 3960$$

12. The renovation budget for the front of a house is \$18,000.00. If you spend 9% on shrubs and flowers, how much of the budget is used?

$$\begin{aligned}\text{Total budget} &= 18,000.00 \\ \text{Spent on shrubs and flowers} &= 9\% \text{ of Total budget} \\ &= \frac{9}{100} \times 18,000.00 \\ \text{Spent on shrubs and flowers} &= \$1,620.00\end{aligned}$$

13. A store clerk sold a pair of skis to a customer. The skis had a retail price of \$219.95. The clerk made up a sales slip that included 15% HST. What is the final amount paid?

$$\text{Retail price of a pair of skis} = \$ 219.95$$

$$\text{HST Rate} = 15\%$$

Hence,

$$\text{HST} = 15\% \times \text{Retail price}$$

Converting the sign of percentage to fraction

$$\text{HST} = \frac{15}{100} \times 219.95$$

Calculating HST

$$\text{HST} = \$ 32.9925$$

As,

$$\text{Final amount to be paid} = \text{Retail price} + \text{HST}$$

Substituting the values

$$\text{Final amount to be paid} = 219.95 + 32.9925$$

Calculating the final amount to be paid

$$\text{Final amount to be paid} = 252.9425$$

14. Bacteria in a water sample increased from 2.6 ppm (parts per million) to 2.9 ppm. What is the percent increase in bacteria?

$$\text{Final number} = 2.9$$

$$\text{Old number} = 2.6$$

$$\text{Increase in bacteria} = 2.9 - 2.6 = 0.3$$

$$\text{Percentage increase} = \frac{0.3}{2.6} \times 100\%$$

$$\text{Percentage increase} = 11.54\%$$

15. Your company has a large container of fuel. You have used 320 gallons of the 1600 total gallons. What percentage of the fuel remains?

$$\text{fuel used} = 320 \text{ gallons}$$

$$\text{total fuel} = 1600 \text{ gallons}$$

$$\text{percentage of fuel used} = \frac{\text{fuel used}}{\text{total fuel}} \times 100\%$$

$$\text{percentage of fuel used} = \frac{320}{1600} \times 100\%$$

$$\text{percentage of fuel used} = 20\%$$

$$\text{percentage of the fuel remains} = 100\% - 20\%$$

$$\text{percentage of the fuel remains} = 80\%$$

16. A company offers a safety harness for \$345.00 (HST included). What is the actual cost of the harness, and what is the cost of the tax (15%)?

$$\text{HST} = 0.15$$

$$\text{Total including HST} = 345.00$$

$$\text{Actual cost} + 0.15 \times \text{Actual cost} = 345$$

$$\text{Actual cost} (1 + 0.15) = 345$$

$$\text{Actual cost} \times 1.15 = 345$$

$$\text{Actual cost} = \frac{345}{1.15}$$

$$\begin{aligned}\text{Actual cost} &= 300 \\ \text{HST} &= 345 - 300 = \$45.00\end{aligned}$$

17. If the price of a tester decreased from \$60 to \$36, What is the percent decrease in the cost?

$$\text{original price} = \$60$$

$$\text{reduced price} = \$36$$

$$\text{reduction in price} = \text{original price} - \text{reduced price}$$

$$\text{reduction in price} = 60 - 36$$

$$\text{reduction in price} = 24$$

$$\text{percentage decrease in price} = \frac{\text{reduction in price}}{\text{original price}} \times 100\%$$

$$\text{percentage decrease in price} = \frac{24}{60} \times 100\%$$

$$\text{percentage decrease in price} = 40\%$$

18. A camera is on sale for 25% off at a price of \$224.96. What was the original price of the camera rounded to the nearest .95? What will the customer pay in total with HST of 15%?

$$\text{Discounted price} = 224.96$$

$$\text{Percentage decrease in price} = 25\%$$

$$\text{Percentage discount} = \frac{\text{Original price} - \text{Discounted price}}{\text{Original price}}$$

$$\frac{25}{100} = \frac{\text{Original price} - 224.96}{\text{Original price}}$$

$$25 \times \text{Original price} = 100 \times (\text{Original price} - 224.96)$$

$$100 \times \text{Original price} - 25 \times \text{Original price} = 22496$$

$$75 \times \text{Original price} = 22496$$

$$\text{Original price} = \frac{22496}{75}$$

$$\text{Original price} = \$299.95$$

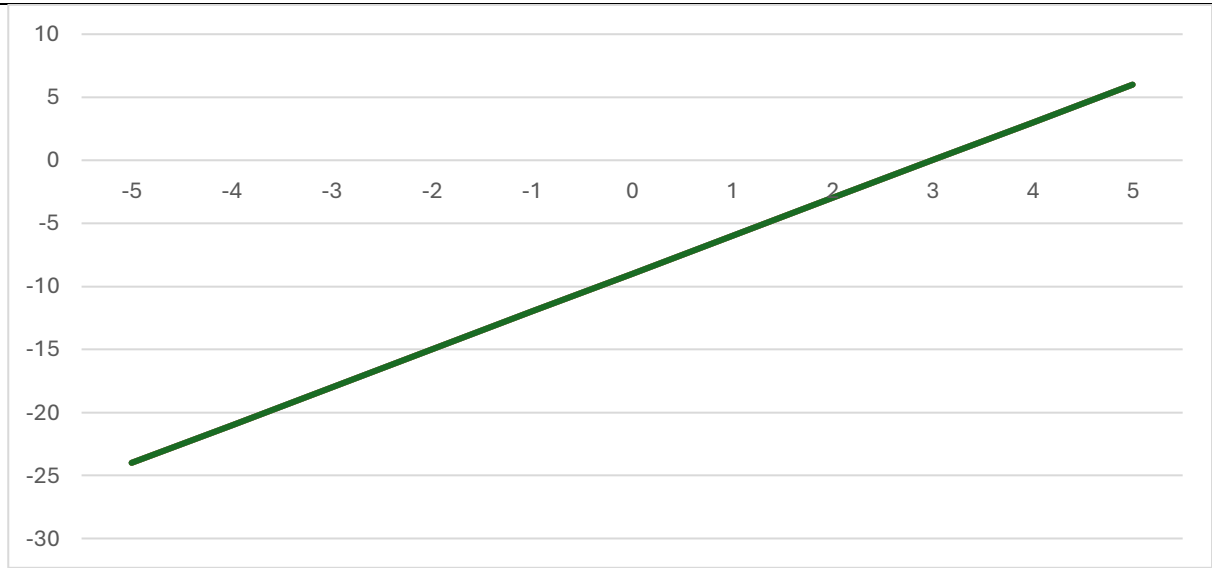
$$\text{Total with HST} = (1.15)224.96 = \$258.70$$

19. Graph each of the following functions. Use a table like the one provided.

- $y = 3x - 9$

Domain and Range:

<i>x</i>	-5	-4	-3	-2	-1	0	1	2	3	4	5
<i>y</i>	-24	-21	-18	-15	-12	-9	-6	-3	0	3	6



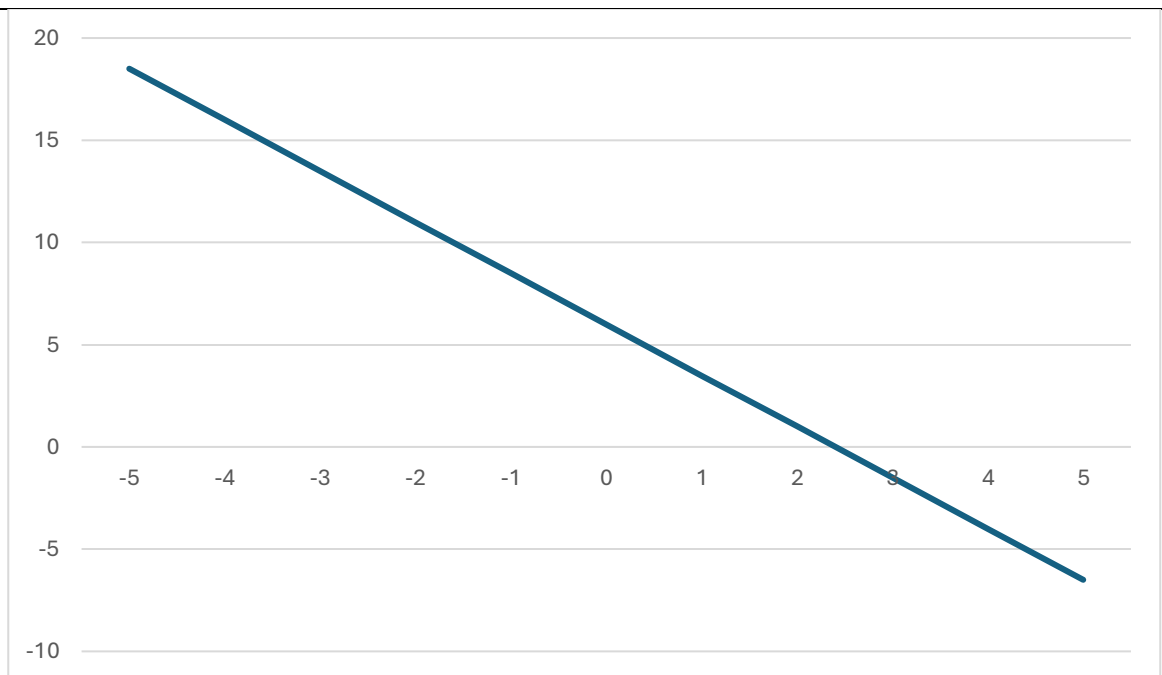
- $5x + 2y = 12$

Subtracting $5x$ from both sides; $2y = 12 - 5x$

Making y the subject of formula; $y = \frac{12-5x}{2}$

Domain and Range:

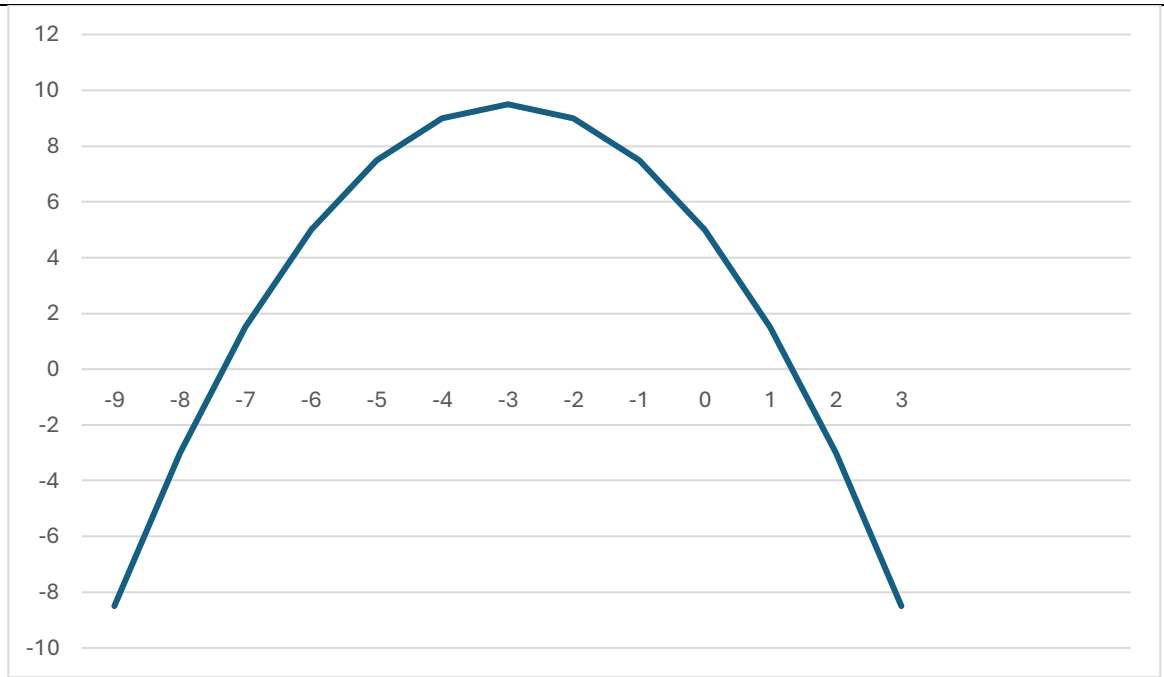
x	-5	-4	-3	-2	-1	0	1	2	3	4	5
y	18.5	16	13.5	11	8.5	6	3.5	1	-1.5	-4	-6.5



- $y = -.5x^2 - 3x + 5$

Domain and Range:

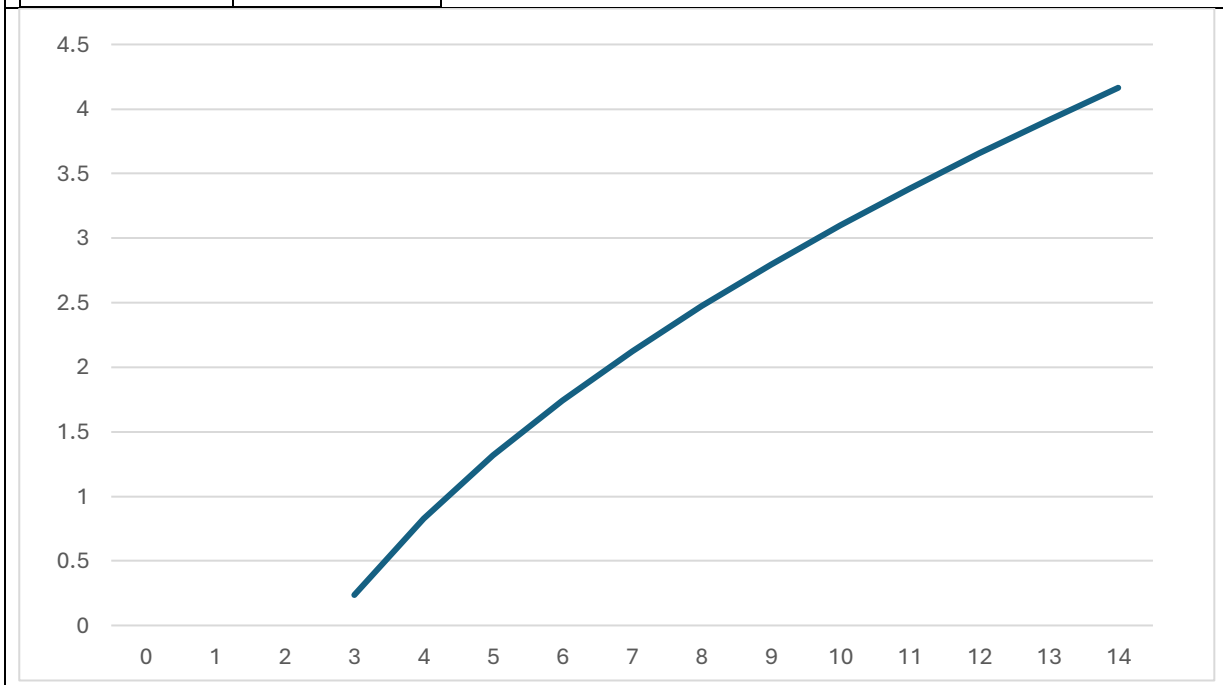
x	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
y	-8.5	-3	1.5	5	7.5	9	9.5	9	7.5	5	1.5	-3	-8.5



- $y = \sqrt{3x - 4} - 2$

Domain and Range:

x	y
2	-0.5857864
3	0.23606798
4	0.82842712
5	1.31662479
6	1.74165739
7	2.12310563
8	2.47213595
9	2.79583152
10	3.09901951
11	3.38516481
12	3.65685425
13	3.91607978
14	4.164414



20. In class we discussed the Math module that is available in Python using import Math. Discuss 4-5 functions of this module which you feel are the most useful. Include the function name, a brief description of the function, and an example of how it can be used.

Name	description	Can Be Used In
float(x)	Converts x to a float	Creating programs which involve money computation
int(x)	Converts x to an integer	Converting user input from string to integer
abs(x)	Returns the absolute value of x	Measuring the distance between two points
%	Gives the remainder after division	Checking even, odd values by dividing by 2 and checking if there is remainder.