Section 1:

1. Simplify $3 + \frac{10}{3} \div \frac{2}{3} + \frac{1}{8} \times 2\frac{2}{3}$

$= 3 + (\frac{10}{3} \times \frac{3}{2}) + (\frac{1}{8} \times \frac{8}{3})$

$= 3 + (5) + (\frac{1}{3})$

$= 8 + \frac{1}{3}$

$= \frac{24}{3} + \frac{1}{3}$

$= \mathbf{\frac{25}{3}}$

2. Solve for x: $x^2 - 10x = -21$

$x^2 - 10x + 21 = 0$

$(x - 3)(x - 7) = 0$

$x - 3 = 0$, and $x - 7 = 0$

$x = 3, 7$

3. The expression $y = x^2 + x + 1$ is:

a) Always positive

$x^2 > x$ for all negative numbers greater than 1 → the expression will be positive.
If x is a negative number between – 1 and 0, $x^2 < x$, however $+1 > x$ → the expression will be positive.

OR,

The determinant from the quadratic formula ($b^2 - 4ac$) is < 0, meaning there is no value for x that yields a $y = 0$, so the value of the expression will not transition from negative to positive through zero, or visa versa. Since all terms are positive → the expression will always be positive.

4. Solve for x: $|x+1| = 2x-3$

$$x+1 = 2x-3$$
$$-x = -4$$
$$x = 4$$

Check:

$$|(4)+1| = 2(4)-3$$
$$|5| = 8-3$$
$$|5| = 5$$

True → $x = 5$ **is a valid solution**

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

Check:

$$\left|(\frac{2}{3})+1\right| = 2(\frac{2}{3})-3$$
$$\left|\frac{5}{3}\right| = \frac{4}{3}-\frac{9}{3}$$
$$\left|\frac{5}{3}\right| = -\frac{5}{3}$$

False → $x = \frac{2}{3}$ is **not** a valid solution

5. Find the equation of the line that passes through the point (1, 2) and is perpendicular to the line $2x-3y=4$.

$2x-3y=4 \rightarrow 3y = 2x-4 \rightarrow y = \frac{2}{3}x - \frac{4}{3} \rightarrow m_1 = \frac{2}{3}$

Perpendicular lines: $m_2 = -\frac{1}{m_1} \rightarrow m_2 = -\frac{3}{2}$

$y = mx + b$

$(2) = \left(-\frac{3}{2}\right)(1) + b$

$2 + \frac{3}{2} = b$

$b = \frac{7}{2}$

$\boldsymbol{y = -\frac{3}{2}x + \frac{7}{2}}$

6. Solve: $\log_3 (x + 3) + \log_3 2 = 2$

$\log_3 2(x + 3) = 2$

$\log_3(2x + 6) = 2$

$3^2 = 2x + 6$

$9 - 6 = 2x$

$3 = 2x$

$\boldsymbol{x = \frac{3}{2}}$

7. Evaluate the expression:

$$\sum_{n=2}^{5} n^3 - 5$$

$n = 2$: $(2)^3 - 5 = 8 - 5 = 3$

$n = 3$: $(3)^3 - 5 = 27 - 5 = 22$

$n = 4$: $(4)^3 - 5 = 64 - 5 = 59$

$n = 5$: $(5)^3 - 5 = 125 - 5 = 120$

$3 + 22 + 59 + 120 = \mathbf{204}$

8. Leif is 3 less than twice Aziz's age. 4 years from now, Sandra will be 2 more than twice Aziz's age. 5 years ago, Sandra was three times Aziz's age. How old was Leif 5 years ago?

Let, $x = Leif's\ age\ now$

$y = Aziz's\ age\ now$

$z = Sandra's\ age\ now$

$x = 2y - 3$ (1)

$z + 4 = 2(y + 4) + 2$ (2)

$z - 5 = 3(y - 5)$ (3)

From (3): $z = 3y - 10$

Sub (3) into (2):

$(3y - 10) + 4 = 2(y + 4) + 2$

$3y - 6 = 2y + 8 + 2$

$y = 16$

From (1):

$x = 2(16) - 3$

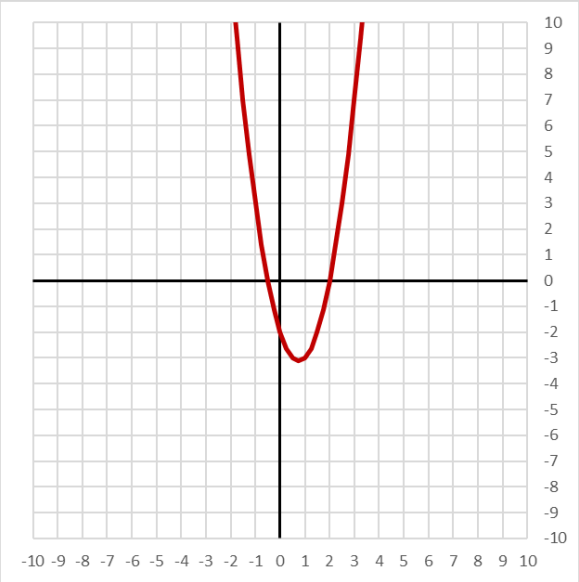
$x = 32 - 3$

$x = 29$ → Leif is 29 years old **now**.

Therefore, Leif was 24 years old five years ago.

Section 2:

1. Graph the following function: $\boldsymbol{y = 2x^2 - 3x - 2}$



@ $x = 0 \rightarrow y = -2$

y – intercept @ $(0, -2)$

@ $y = 0$,

$2x^2 - 3x - 2 = 0$

$(2x + 1)(x - 2) = 0$

$x = -\frac{1}{2}, 2$

Two x – intercepts @ $(2, 0)$ & $(-\frac{1}{2}, 0)$

2. *As part of your short essay response, it may be significant to note the following points. Please use proper sentence structure, and check your spelling, grammar and punctuation. Include any final conclusions that link the charts, and your own conclusions from the data presented.*

   From chart 1 we see that First Nations men were more likely to be employed than women. There are also age differences as men were significantly more likely to be employed than women in the 25 to 34 years and 35 to 44 years age groups. However, the divide was not significant between men and women aged 45 to 54 years.

   Regarding chart 2, among those who were employed part-time, more than one third (36.9%) did so for what are called involuntary reasons; these may include business conditions or not being able to find work with 30 or more hours per week it is significant to note that the part-time employees.

   From chart 3, First Nations men with less than high school were more than twice as likely to be employed as First Nations women who had not completed high school (50.4% versus 23.9%). The gap in employment between First Nations men and women narrowed with higher levels of education.

   An examination of charts 4 and 5 reveals the kinds of industries employing core working-age First Nations women was different than that of men. Three industries—health care and social assistance, retail trade and educational services—employed 44.6% of First Nations women, where construction was the most commonly reported industry, with 17.1% of core working-age, First Nations men employed in this field, followed by public administration (9.1%) and manufacturing (8.8%).

Section 3:

1. While many people think of the lottery as a harmless way to have fun and possibly win some money, buying lottery tickets is a form of gambling. Therefore, public officials shouldn't buy lottery tickets.

   The argument above relies upon which of the following assumptions?

   The premise of the passage is that buying lottery tickets is a form of gambling, which leads to the conclusion that public officials should not buy lottery tickets. Therefore, the assumption must be that public officials should not gamble or statement (c). The other statements are out of scope as they introduce other information or begin to draw further inferences following the argument.

2.

   a) What is the earliest track that M can fill?

      The earliest track that M can fill is track number 4, since both H and L must precede M, and F is always in the second track.

   b) If H is placed fifth, and K is placed third, what are all of the possible positions for G?

      The only position for G would be first. F would be 2nd; K would be 3rd; G cannot be in the 4th, 5th or 6th tracks since H is 5th; and since H is 5th, L must be 6th, and M must be 7th. Therefore, the only available position is 1st.

   c) What are all of the possible sequences starting with K followed by F then G?

      There is only one sequence: K, F, G, J, H, L, M. Since G is 3rd, H cannot be 4th, and must be 5th, so that L and M can be 6th and 7th respectively.