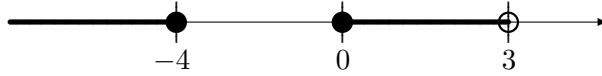[15] 1. Answer each of the following questions by checking one or more of the corresponding boxes. Some questions may require you to check more than one box in order to create the most complete and correct statement.

(a) The set defined by the following number line:

can be denoted as

☐ $(-\infty, -4) \cup (0, 3)$
☐ $[-\infty, -4] \cup [0, 3]$
☐ $(-\infty, -4) \cup (0, 3]$
☐ $(-\infty, -4] \cup [0, 3)$
☐ $(-\infty, -4] \cup [0, 3]$

(b) Which of the following sets of points <u>cannot</u> lie on a curve which represents the graph of a function?

☐ $(0, 0), (1, 1), (2, 2), (3, 3), (4, 4)$
☐ $(-2, 2), (-1, 1), (0, 5), (1, 1), (2, 2)$
☐ $(0, 2), (1, 2), (2, 2), (3, 2), (4, 2)$
☐ $(-1, 1), (0, 2), (1, 2), (1, 3), (2, 3)$
☐ $(-3, -2), (0, 3), (2, 0), (4, 2), (5, 4)$

(c) -2 belongs to which set(s) of numbers?

☐ $\mathbb{R}$
☐ $\mathbb{Q}$
☐ the set of irrational numbers
☐ $\mathbb{Z}$
☐ $\mathbb{N}$

(d) $-3 \cdot |3 - 7| =$

☐ 30
☐ -30
☐ 12
☐ -12
☐ none of the above

(e) Which statement(s) is (are) true for the graph of a linear function?

☐ the graph can have zero x-intercepts
☐ the graph can have one x-intercept
☐ the graph can have more than one x-intercept
☐ the graph can have zero y-intercepts
☐ the graph can have one y-intercept

[5] 2. Solve the equation
$$\frac{1}{6}x - 4 = 3 - \frac{2}{9}x.$$

[5] 3. Solve the following inequality, writing your solution as an interval:
$$5x \leq 5 - 2(7 - 4x).$$

[3] 4. Give the definition of $|x|$ as a piecewise function.

[6]   5. A line ℓ has equation
$$3x + 4y + 5 = 0.$$
Find the equation of the line perpendicular to ℓ which passes through the point $(3, -2)$.

[6]   6. Sketch the graph of
$$f(x) = -3 - 2x$$
on the axes below. Show your workings. Label the graph carefully. Do <u>NOT</u> use a table of values. What are the domain and range of $f(x)$?

[40]