Quiz 1. *True/False*: The number 1 is prime.

Solution. The statement is *false*. A prime number is an integer greater than 1 that can only be factored as the product of one and itself. So for example, the integer 11 is prime because we can only factor 11 as $11 = 1 \cdot 11$. However, the integer 12 is not prime because we can write $12 = 2 \cdot 6$, neither of which are 1 or 12.

Quiz 2. *True/False*: $\gcd(2^3 \cdot 3 \cdot 5, 2 \cdot 3^2 \cdot 7) = 2^3 \cdot 3^2 \cdot 5 \cdot 7$.

Solution. The statement is *false*. Remember given a prime factorization of the numbers, we find the gcd by choosing the *smallest* powers of each prime that appears in the factorizations. So we should have $\gcd(2^3 \cdot 3 \cdot 5, 2 \cdot 3^2 \cdot 7) = 2 \cdot 3$. Instead, the largest power of each prime that appears in the factorizations was chosen which is how we compute the lcm. Therefore, we have $\operatorname{lcm}(2^3 \cdot 3 \cdot 5, 2 \cdot 3^2 \cdot 7) = 2^3 \cdot 3^2 \cdot 5 \cdot 7$.

Quiz 3. *True/False*: $\sqrt[3]{2^8 \cdot 3^3 \cdot 5^1 \cdot 7^5} = 2^2 \cdot 3^1 \cdot 7\sqrt[3]{2^2 \cdot 5^1 \cdot 7^2}$

Solution. The statement is *true*. There are two ways to think about this. First, we should write out the numbers and group them into threes and pull out/leave the terms appropriately:

$$\sqrt[3]{2^8 \cdot 3^3 \cdot 5^1 \cdot 7^5} = \sqrt[3]{\underline{2 \cdot 2 \cdot 2} \cdot \underline{2 \cdot 2 \cdot 2} \cdot 2 \cdot 2 \cdot \underline{3 \cdot 3 \cdot 3} \cdot 5 \cdot \underline{7 \cdot 7 \cdot 7} \cdot 7 \cdot 7} = 2^2 \cdot 3^1 \cdot 7\sqrt[3]{2^2 \cdot 5 \cdot 7^2}$$

Alternatively, we can use division. We know that $8/3$ is 2 with remainder 2, $3/3$ is 1 with remainder 0, $1/3$ is 0 with remainder 1, and $5/3$ is 1 with remainder 2. So we can pull out two 3's with 2 remaining, one 3 with 0 remaining, no 5's with 1 remaining, and two 7's with 2 remaining, which gives:

$$\sqrt[3]{2^8 \cdot 3^3 \cdot 5^1 \cdot 7^5} = 2^2 \cdot 3^1 \cdot 7\sqrt[3]{2^2 \cdot 5^1 \cdot 7^2}$$

Quiz 4. *True/False*: 68 increased by 119% is $68(1.19)$.

Solution. The statement is *false*. To find 119% of 68, we would multiply 68 by the percent written as a decimal. This would be $68(1.19)$. However, to increase or decrease a number by a percentage, we compute the number $\#(1 \pm \%)$, where we add if we are increasing, subtract if we are decreasing, $\#$ is the number, and % is the percentage written as a decimal. So to increase 68 by 119%, we need to compute $68(1 + 1.19) = 68(2.19)$.

Quiz 5. *True/False*: If $f(x) = 3x + 5$ and $g(x) = 1 - 2x$, then $(f \circ g)(1) = 8$.

Solution. The statement is *false*. Recall that $(f \circ g)(1) = f(g(1))$. First, we compute $g(1)$: $g(1) = 1 - 2(1) = 1 - 2 = -1$. Then we need to compute $f(g(1)) = f(-1)$. We have $f(-1) = 3(-1) + 5 = -3 + 5 = 2$.

Quiz 6. *True/False*: The point $(1, -3)$ is on the graph of $f(x) = x - 3$.

Solution. The statement is *false*. We have the point $(x, y) = (1, -3)$. If this point is on the graph of $f(x)$, then these x and y satisfy the equation for $f(x)$. We can check this:

$$\begin{aligned} f(x) &= x - 3 \\ -3 &= 1 - 3 \\ -3 &\neq -2 \end{aligned}$$

Therefore, the point $(1, -3)$ is not on the graph of $f(x)$. Alternatively, if $x = 1$, then the corresponding point on the graph of $f(x)$ would have y-value $f(1) = 1 - 3 = -2$. Then the point $(1, -2)$ is on the graph of $f(x)$. But then $(1, -3)$ is not on the graph of $f(x)$.

Quiz 7. *True/False*: The graph of the solutions to $2x - 6y = 9$.

Solution. The statement is *true*. The graph of the set of solutions to an equation of the form $Ax + By = C$ is a line. Here we have $A = 2$, $B = -6$, and $C = 9$. Notice also we can solve for y:

$$\begin{aligned} 2x - 6y &= 9 \\ -6y &= -2x + 9 \\ y &= \frac{-2}{-6}\,x + \frac{9}{-6} \\ y &= \frac{1}{3}\,x - \frac{3}{2} \end{aligned}$$

The function $f(x) = \frac{1}{3}x - \frac{3}{2}$ is a linear function, whose graph must be a line.

Quiz 8. *True/False*: The line through $(-1, 5)$ with slope 3 is $y = 3x + 8$.

Solution. The statement is *true*. We know that the line contains the $(-1, 5)$ and has slope 3, i.e. $m = 3$. Then we have

$$\begin{aligned} y &= mx + b \\ y &= 3x + b \\ 5 &= 3(-1) + b \\ 5 &= -3 + b \\ b &= 8 \end{aligned}$$

Therefore, the equation of the line is $y = 3x + 8$.

Quiz 9. *True/False*: A function cannot have two y-intercepts.

Solution. The statement is *true*. If a function had two y-intercepts, then there would be two points on the graph of the function on the y-axis. But then the function would fail the vertical line test—which is impossible because it is a function.