1. If $a$ is nonzero answer the following:
   (a) $a/1 = a$
   (b) $a/a = 1$ for $a \neq 0$
   (c) $0/a = 0$
   (d) $(-a)^2 = a^2$
   (e) $(-1)a + a = 0$
   (f) $(-a)^3 = -(a^3)$
   (g) $a^0 = 1$

2. Add, multiply and divide $5/3$ and $4/7$.
   $\frac{5}{3} + \frac{4}{7} = \frac{47}{21}$
   $\frac{5}{3} \cdot \frac{4}{7} = \frac{20}{21}$
   $\frac{5}{3} - \frac{4}{7} = \frac{35}{21}$

3. What is the prime factorization of 30?
   $2 \cdot 3 \cdot 5 = 30$

4. If $a < 0$ what is the absolute value of $a$?
   $|a| = -a$

5. Multiply $(2x - 3)(3x + 4)$.
   FOIL to get $6x^2 - x - 12$.

   $(x + 3)(x - 3)$

7. What is a function?
   A relationship between two sets called the domain and the co-domain such that each thing in the domain is related to exactly one thing in the co-domain.
8. What is the quadratic formula and what is it used for?
If we have a second degree polynomial \(ax^2 + bx + c\) and we want to find the roots we use
\[x = \frac{-b \pm \sqrt{-b^2 - 4ac}}{2a}\]

9. If a circle has radius \(r\) what is the circle’s area and circumference?
Area is \(A = \pi r^2\), circumference is \(C = 2\pi r\).

10. If a right triangle has base \(b\) and height \(h\) what is the length of the hypotenuse and what is the area of the triangle? Use the Pythagorean Theorem to give the hypotenuse has length \(\sqrt{b^2 + h^2}\); we can use basic geometry to find that the area of the triangle is \(A = \frac{1}{2}bh\).

11. Solve \(x^2 + 5x + 4 = 0\).
We factor and get \((x + 4)(x + 1) = 0 \rightarrow x = -4\) or \(x = -1\).

12. If \(f(x) = x^2 + 2x - \pi^2\), what is \(\sin(f(\pi))\)?
First we plug \(\pi\) into our function \(f\) to get \(f(\pi) = \pi^2 + 2\pi - \pi^2 = 2\pi\), then we plug \(2\pi\) into the sine function to get \(\sin(f(\pi)) = \sin(2\pi) = \).

13. If a line goes through the point \((2, 3)\) and has a slope of \(-1/3\) what is the equation of the line?
Use the point slope formula to get \(y - 3 = -1/3(x - 2)\).

14. What are the domain and range of the function \(f(x) = x^2\)?
The domain of a function is the set of numbers that we are allowed to plug into a function without making the function do something bad (like divide by zero or take the square root of a negative number). The range of a function are the set of numbers that the function outputs. In this case the domain is the set of all real numbers and the range is the set of non-negative real numbers.

15. Multiply and divide 762 and 3 (i.e. what is \(762 \cdot 3\) and what is \(\frac{762}{3}\))?
Without using a calculator we use our multiplication and division algorithms to get \(762 \cdot 3 = 2286\) and \(\frac{762}{3} = 254\)

16. Solve \(\frac{2}{3} + \frac{4}{x} = \frac{1}{2}\).
Multiply both sides of the equation by \(6x\) to clear out all fractions and we are left with \(4x + 24 = 3x \Rightarrow x = -24\).