



# Epsilon Camp

## 2017 Readiness Assessment

- There is no time limit. It is okay to take breaks or work on the problems over several days.
- Attempt all of the questions without help. You may look up definitions of unfamiliar terms.
- Show your work. We are more interested in seeing your thinking process than the correct answer.
- Don't worry if you cannot complete every problem, the assessment will not be graded.
- Draw a box around your final answers.

A

1)  $351 + 649$

2)  $231 + 177$

3)  $17 \times 8$

4)  $19 \times 22$

5)  $1789 - 325$

6)  $349 - 400$

7)  $15 \div 3$

8)  $21 \div 2$

Write three or four questions similar to any of those given above, and find their solution.

# B

1)  $\frac{2}{3} + \frac{3}{4}$

2)  $\frac{15}{11} - \frac{2}{5}$

3)  $(17 + 3)(5 - 2)$

4)  $((3 + 5) \div 2 + 5)(16 - 11)$

5)  $12^2$

6)  $5^4$

7) What is the decimal expansion of  $\frac{4}{5}$ ?

8) What is the decimal expansion of  $\frac{3}{7}$ ?

9) Expand  $3(x + 2)$

10) Expand  $(x - 3)(x + 2)$

11) Expand  $(x - y)(x + y)$

12) Simplify  $3x + 5y - 2x - 3x + y - xy$

13) Write the following in mathematical notation: Twice  $x$  plus  $y$  all over 3.

14) Write the following in mathematical notation: Three less than half the sum of  $x$  and three  $y$ .

15) Find the least common multiple and greatest common factor of 10 and 15.

16) Find the least common multiple and greatest common factor of 12 and 21.

17) Draw an acute angle.

18) Draw a rhombus that is not a square.

Write three or four questions similar to any of those given above, and find their solution:

C

1) Factor the polynomials  $x^2 - 2x$  and  $x^2 + x - 12$ :

2) Find the value of  $x$  so that  $x/2 + 3 = 4$ , and  $y$  so that  $5y - 2 = 7$

3) Draw two circles. On one use a ruler to mark its diameter, on the other use a ruler to mark its radius.

4) Find the prime factorizations of the following numbers: 5, 15, 81 and 1001.

5) If  $x + 2 \geq 7$ , find the smallest possible value of  $x$ :

6) Sketch the graphs of  $f(x) = 2x$ ,  $g(x) = x^2$  and  $h(x) = x^3 - x$ :

- 7) If you multiply 16 by 11 you get 176. Likewise, 23 times 11 gives 253. In general, when multiplied by 11, the number with digits  $a$  and  $b$  gives the number with digits  $a (a + b) b$  for example  $35 \times 11$  is 385, where 8 is  $3+5$ .
- a) Can you say how and why this works by considering place value?

- b) Can you find a rule for what happens when  $(a + b)$  is greater than 9?