

SchoolNova, Math 5c
Homework 4
More Numbers and Fractions
October 15, 2017

Please provide sufficient details about how you solved the problem. More difficult problems are marked with a *. If unable to solve a problem, please present your thoughts and partial solution. The problems, which require some algebra are also marked with a *, this will be covered during the course.

1. In the following sequence, every term, starting with the fourth term is the sum of the three terms before it.

$$1, 1, 2, 4, 7, 13, 24, \dots$$

Is the 100th term in the sequence even or odd?

2. Five lamps L_1, L_2, L_3, L_4 and L_5 are arranged in a row as shown below. Each lamp has its own switch. All five lamps are initially off. Ben starts to turn each switch from L_1 through L_5 , in order, and he repeats the pattern, always from L_1 through L_5 , until he turns the switches 126 times. Which lamps are on in the end?

$$L_1 \quad L_2 \quad L_3 \quad L_4 \quad L_5$$

3. Is the expression $1 \times 2 + 3 \times 4 + 5 \times 6 \dots 99 \times 100$ even or odd?
4. $1^2 + 2^2 + 3^2 + \dots + 25^2 = 5525$ and
 $2^2 + 4^2 + 6^2 + \dots + 50^2 = N$.
Find the value of N .
5. * Show that if n and m are divisible by d , then each of the following numbers is divisible by d :
(a) $n + m$ (b) $5n + 3m$
6. * If x and y are positive consecutive *even integers*, with $y > x$, which of the following is equal to $y^2 - x^2$?
(a) $2x$ (b) $4x$ (c) $2x+2$ (d) $2x+4$ (e) $4x + 4$
7. A boy had a bag of apples. He gave $1/2$ of them to his parents, $1/5$ to his brother, $1/4$ to his sister, and the last apple he ate himself. How many apples did he originally have?
8. If $0 < a < b$, which of the following is greater than b/a ?
(a) 1 (b) a/b (c) $1/(b/a)$ (d) $b/(2a)$ (e) $2b/a$
9. If $x < x^2 < x^3$, which of the following could be the value of x ?
(a) -2 (b) $-\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1 (e) $\frac{3}{2}$
10. * Find the sum:

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} \dots \frac{1}{11 \times 12}$$

(There is a clever trick)