**Lower Elementary:**

*Question:* James has a New Year’s resolution to be able to run a kilometre without stopping. If he can run one quarter of a kilometre without stopping by the end of January and he adds another quarter of a kilometre every month, then by the end of which month will James be able to run the full kilometre without stopping?

**Upper Elementary:**

*Question:* Barb’s New Year’s resolution is to build her vocabulary. She plans to learn 3 new words in January, 6 new words in February, 12 new words in March, 24 new words in April, and so on. If the pattern continues, then how many new words are on Barb’s 2018 vocabulary list in total?

**Middle School:**

*Question:* Daniel’s New Year’s resolution is to visit the library more often. He will consider his resolution successful if he goes to the library on 40% of the days in 2018. How many days need to include library visits for Daniel’s resolution to be successful?

**Algebra and Up:**

*Question:* Sally has a New Year’s resolution to practice playing her violin for more than three hours per week. She won’t practice for more than one hour per day. Write a compound inequality that represents the amount of time Sally will practice playing the violin per week, then plot the inequality on a number line.

**Lower Elementary:**

*Question:* James has a New Year’s resolution to be able to run a kilometre without stopping. If he can run one quarter of a kilometre without stopping by the end of January and he adds another quarter of a kilometre every month, then by the end of which month will James be able to run the full kilometre without stopping?

*Answer:* April

*Solution:* There are 4 quarters in a whole, so it’ll take 4 months—January, February, March, and April—for James to be able to run a whole kilometre without stopping. James will be able to run the full kilometre by the end of April.

**Upper Elementary:**

*Question:* Barb’s New Year’s resolution is to build her vocabulary. She plans to learn 3 new words in January, 6 new words in February, 12 new words in March, 24 new words in April, and so on. If the pattern continues, then how many new words are on Barb’s 2018 vocabulary list in total?

*Answer:* 12 285 words

*Solution:* Each month, Barb learns twice as many vocabulary words as she did the previous month. So, Barb will learn 24 × 2 = 48 words in May, 48 × 2 = 96 in June, 96 × 2 = 192 in July, 192 × 2 = 384 in August, 384 × 2 = 768 in September, 768 × 2 = 1536 in October, 1536 × 2 = 3072 in November, and 3072 × 2 = 6144 in December. If we add them all up, we get 12 285 words in total.

**Middle School:**

*Question:* Daniel’s New Year’s resolution is to visit the library more often. He will consider his resolution successful if he goes to the library on 40% of the days in 2018. How many days need to include library visits for Daniel’s resolution to be successful?

*Answer:* 146 days

*Solution:* 2018 is not a Leap Year, so there will be 365 days. For Daniel to visit the library on 40% of those days, he will need to visit the library on 365 × 0.4 = 146 days.

**Algebra and Up:**

*Question:* Sally has a New Year’s resolution to practice playing her violin for more than three hours per week. She won’t practice for more than one hour per day. Write a compound inequality that represents the amount of time Sally will practice playing the violin per week, then plot the inequality on a number line.

*Answer:* 3 < ***x*** ≤ 7

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3 7

*Solution:* Since the number of hours Sally practices is more than 3, we can write that part of the inequality 3 < ***x*** and represent it on the number line with an open circle because 3 isn’t included in the possible values of ***x***. Since Sally won’t play more than more than an hour per day (7 hours per week), we know that Sally will play less than or equal to 7 hours: ***x*** ≤ 7. When we represent that part on the number line, we use a closed circle because 7 is an included value.