Math Challenge #12

First Name: _____ **Last Name:** _____ **Grade:** _____

Teacher: _____ **Parent's email:** _____

Clocks and Calendar

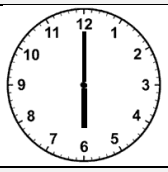
Welcome to Math Challenge #12. In this challenge, we will be working on solving problems involving time. Humans started telling time centuries ago. Initially people guessed the time of day by looking at the sun's position. The sundial followed, which uses a shadow caused by the sun. The number the shadow rests on indicates the time.

Today we use analog clocks, which tell time using dials, and digital clocks, which display the hour and minutes. We also use AM (a.m.) and PM (p.m.) to indicate morning or night. AM (abbreviation for the Latin phrase Ante Meridiem) means it is morning time from midnight to noon. PM (Latin for Post Meridiem) is from noon to midnight. We also organize our days for activities using a calendar. A calendar shows the days, weeks, and months of a specific years. Understanding the fundamentals of our calendar system is essential. Enjoy the following problems from reading clocks to solving time problems and calendar problems.

March 2019

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Kinder & First Grade: solve <u>at least</u> 3 problems.
Second & Third Grade: solve <u>at least</u> 7 problems.
Fourth Grade and above: solve <u>at least</u> 12 problems.

		Answer
1.	Zack's baseball practice started at 4:00 pm and ended at 6:00 p.m. How long did the practice last?	*2 hours*
2.	These are the days of the week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. a. If yesterday was Friday, what day is tomorrow? b. If tomorrow is Sunday, what day is the day before yesterday?	*a. Sunday* *b. Thursday*
3.	Keya woke up at 6:00 a.m. Her brother woke up 3 hours later. Her mom woke up 2 hours before her brother. What time did Keya's mom wake up? 	*7 am*
4.	 Mrs. Hein's math class starts at 1:30 pm and ends at the time shown on the clock. How long, in minutes, is her math class? 1 hour = 60 minutes	*90 minutes*
5.	Last Saturday, Caitlin had breakfast at 8:30 am. Her drama rehearsal started an hour later and lasted for two hours. What time was her drama rehearsal over? 	*11:30 a.m.*
6.	Parker played video games for 45 minutes. If he finished playing at 6:15 pm, what time did he start playing?	*5:30 p.m.*

7.	Olga began working in her garden at 8:20 am. She planted carrots and potatoes for 30 minutes. She then trimmed the rose bushes for 25 minutes before taking a 10 minute break. At what time did her break end?	*9:25 a.m.*
8.	 It takes 1 hour and 15 minutes to bake a cake. If I put the cake mixture in the oven at 2:20 pm, what time will it be ready?	*3:35 p.m.*
9.	Days of the week. a. If January 1st falls on Thursday, what day is January 31? Notice that Jan 1, 8, 15, 22, and 29 falls on Thu. So, Jan 30 falls on Fri and Jan 31 falls on Sat. b. If Halloween falls on Wednesday, what day is October 1? Halloween is on Oct 31, then Oct 24, 17, 10, and 3 falls on Wed too. So, Oct 2 falls on Tue, and Oct 1 falls on Mon. c. If April Fool's day falls on Sunday, what day is March 21? March has 31 days. April Fool's Day is April 1st, Sunday. Thus, March 31st is Saturday, as well as March 24. Then March 24 – 3 = 21, Saturday – 3 = Wednesday	*a. Saturday* *b. Monday* *c. Wednesday*
10.	Daily trains leave the station every half hour. The first train leaves at 9:10 a.m. What time will the seventh train leave? 9:10am 9:40am 10:10am 10:40am 11:10am 11:40am **12:10 pm** 1st 2nd 3rd 4th 5th 6th **7th** Or between the 1st and 7th train, there are 6 spaces. Each space is 30 minutes. 6×30 min = 3 hours. 9:10 am + 3 hours = 12:10 pm	*12:10 p.m.*
11.	A donut shop is open from 6 am to 2:30 pm on weekdays and from 6 am to 4:30 pm on Saturdays and Sundays. How long is the donut shop open in a week? Weekdays: 5 x 8 ½ hours = 42 ½ hours Weekend: 2 x 10 ½ = 21 hours. Total: 42 ½ + 21 = 63 ½ hours.	*63 ½ [hours] or* *63.5 [hours]*
12.	 Angela takes 8 minutes to run one loop around the school track. Sophia can run the same loop 8 times in one hour. Who is faster? Sophia runs 8 loops in 1 hour, Angela runs 8 loops in 64 minutes. Sophia is faster	*Sophia*
13.	How many minutes are there between 9:25 p.m. on Thursday and 1:19 a.m. on Saturday? Thursday 9:25 p.m. +24 hours = 9:25 p.m. Friday Friday 9:25 p.m. + 4 hours = 1:25 a.m. Saturday 28h × 60 = 1680 minutes Subtract 6 minutes to get 1:19 a.m. on Saturday: 1680 – 6 = 1674 minutes	*1674 [minutes]*
14.	Days of the week. a. If two days ago was Friday, what day is 3 days from today? Today is Sun, and three days from today is Wed. b. If yesterday was Saturday, what day is 100 days from today? Today is Sun, 7 days from today is also Sunday, so will 14 days, 21 days, and 28 days from today. The closest multiple of 7 to 100 is 98. So, 98 from today is also Sunday. Therefore, 100 days from today is Tuesday. c. If tomorrow is Monday, what day is 300 days from today? Today is Sunday, and the closest multiple of 7 to 300 is 301. Since it will be Sunday after 301 days, 300 from today is Saturday.	*a. Wednesday* *b. Tuesday* *c. Saturday*

15. Jim took 3 hours and 20 minutes to work out 100 challenging problems. Ian solved the same questions 35 minutes faster than Jim. Both of them started working on the problems at 2:30 p.m. At what time did Ian finish solving them?

5:15 pm

It took Ian 35 less minutes than Jim: 3 h 20 min – 35 min = 2 h 45 min
2:30 p.m. + 2 h 45 min = 5:15 p.m.

16. Mr. and Mrs. Corrino can complete a job in 5 hours, working together. If Mr. Corrino works twice as long as Mrs. Corrino if each does the job alone, how many hours does it take Mrs. Corrino to complete the job alone?

7 ½ [hours] or 7.5 [hours]

One way:
Think about this problem as Time-Speed-Distance problem. Speed × Time = Distance

	Speed to do 1 job	Time, hours	Amount of work
Mr. Corrino	1/t	t	1
Mrs. Corrino	2/t	t	2
Together	3/t	5	1

5×3/t = 1. t = 15 hours, if they worked independently it would take Mr. Corrino 15 hours to finish 1 job, but Mrs. Corrino is twice faster. 15÷2 = 7 hours 30 min → 7 ½ hours.
Another way: Think that Mrs. C is twice as productive as Mr. C, so for her to finish Mr. C's share of the job, she would need extra time equal to half the duration of her share of the job, or 5 + 2.5 = 7.5

17. A family is moving from Bellevue to Redmond. Their car traveling at 70 mph on Interstate 5 **is 2 miles behind the U-Haul truck** traveling at 60 mph in the same direction. How long will it take the car to catch up to the U-Haul truck?

1/5 hour or 12 minutes

Every hour the car travels an extra distance of 70 – 60 = 10 miles.
The car covers extra 10 miles in 1h, so it will cover 2 miles in $\frac{1}{10} \cdot 2 = \frac{1}{5} hour = \frac{1}{5} \cdot 60 = 12\ minutes$

18. Two cyclists start at the same time from opposite ends of a course that is 45 miles long. One cyclist is riding at 14 mph and the second cyclist is riding at 16 mph. How long after they begin will they meet?

1.5 hours

Every hour two cyclists are getting 14+16 =30 miles closer. The initial distance between them is 45 miles. 45÷ 30 = 1.5 hours until they meet.

Solution is available on April 5, 2019 at www.mathinaction.org