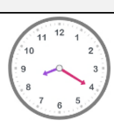
Math Challenge #13

Measuring Time

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

		Answer
1.	Maya wakes up at 7:00 AM and takes 30 minutes to get ready for school. What time is she ready?	*7:30 AM or* *7:30 a.m.*
2.	Arrange the following activities in order from the shortest to the longest time: Activity A: Practicing piano (30 minutes) Activity B: Brushing your teeth (2 minutes) Activity C: Watching a movie (90 minutes) Activity D: Napping (2 hours) ***Hint:*** *Remember that **one hour = 60 minutes**. Compare the times carefully before ordering them.*	*B, A, C, D*
3.	Alexa goes to bed at 9:00 PM. If it is 8:30 PM now, how many more minutes are there until bedtime?	*30 [minutes]*
4.	Lily's birthday party starts at 2:00 PM and ends at 4:30 PM. How long (in hours and minutes) does Lily's birthday party last?	*2 hours 30 minutes*
5.	First: 15 min 30 sec → Tracy Second: 15 min 50 sec → Aaron Third: 16 min 5 sec → Danika	*Tracy, Aaron, Danika*
6.	9:30 AM + 1 hour 15 min = 10:45 AM 10:45 AM + 10 min + 45 min = **11:40 AM**	*11:40 AM or* *11:40 a.m.*
7.	Time after the first movie and a break: 12:00 PM + 1 hour 45 min + 15 min = 2:00 PM Time after the second movie and a break: 2:00 PM + 1 hour 45 min + 15 min = 4:00 PM Time after the third movie: 4:00 PM + 1 hour 45 min = 5:45 PM Another way to solve it is by calculating the total time of movies and the total time of breaks. Three movies: (1 hour 45 min) × 3 = 5 hours 15 min; total break time: 15 min × 2 = 30 min Total marathon time: 5 hours 15 min + 30 min = 5 hours and 45 min. So, 5 hours and 45 min after 12:00 PM is **5:45 PM.**	*5:45 PM or* *5:45 p.m.*
8.	 It took 20 minutes to go back to 8 o'clock. 55 – 20 = 35 minutes before 8 o'clock is 7:25.	*7:25*
9.	a. How long was the power out? From 7:40 PM to midnight: 4 hours and 20 minutes From midnight to 4:15 AM: 4 hours and 15 minutes Total: **8 hours 35 minutes** b. If a backup generator provided power to essential buildings for the first 5 hours of outage, how many hours were those buildings without power after the generator ran out? 8 hours 35 minutes – 5 hours = **3 hours and 35 minutes**	*a. 8 hours 35 minutes* *b. 3 hours 35 minutes*

10.	a. What time is it in London when she calls? 7:30 PM + 4 hours = **11:30 PM** (London time) b. If her friend in London takes 45 minutes to call her back, what time is it in New York when Lisa receives the call? **8:15 PM** New York time.	*a. 11:30 PM or 11:30 p.m.* *b. 8:15 PM or 8:15 p.m.*
11.	a. What time will the match start in Chicago? To convert time from Tokyo (UTC +9) to Chicago (UTC -5), we find the time difference: 9−(−5)=9+5=14 hours difference. Since Tokyo is ahead of Chicago by 14 hours, we subtract 14 hours from 3:30 PM JST to find the start time in Chicago: 3:30 PM – 14 hours = 1:30 AM Chicago time, same day. The match starts at **1:30 AM** in Chicago. b. If the match lasts 2 hours and 15 minutes, what time will it end in Chicago? 1:30 AM + 2 hours 15 min = **3:45 AM**	*a. 1:30 AM* *b. 3:45 AM*
12.	a. What time does Olivia's flight land in New York (local time)? 10:25 AM + 5 hours and 45 minutes = 4:10 PM Seattle time. Since New York is 3 hours ahead, Olivia lands in New York at **7:10 PM** (EDT) b. If she spends 1 hour and 55 minutes in transit before taking a connecting flight to Paris, what time does her flight to Paris depart (local New York time)? 7:10 PM + 1 hour and 55 minutes = **9:05 PM** (EDT) c. If the flight time to Paris is 7 hours and 15 minutes, what time will Olivia land in Paris local time (CET, UTC +1)? 9:05 PM (EDT)+7:15=4:20 AM (EDT, UTC -4). Paris is **5 hour ahead of New York time**: 4:20 AM (UTC)+5 hour=9:20 AM (CET)	*a. 7:10 PM* *b. 9:05 PM* *c. 9:20 AM*
13.	Actual working time: 8 hours – (15 min + 15 min + 30 min) = 7 hours. Total number of boxes produced: 240 × 7 hours = **1680 boxes**.	*1680 [boxes]*
14.	Train A has a 1.5-hour head start. Since Train A travels at **50 miles per hour**, in **1.5 hours**, it will cover: 50×1.5 = 75 miles. By 8:15 AM, Train A is 75 miles ahead. The remaining distance between them is 240 – 75 = 165 miles. In each hour, they get closer by 50+70 = 120 miles. In another hour, they reduce the gap by 120 miles, and in another 15 min, they reduce it by 30 miles. So, every minute, they will reduce their distance by 2 miles. One hour after 8:15 AM, which is 9:15 AM, they will be 165 – 120 = 45 miles apart. In another 22.5 minutes, they will cover the 45 miles distance. 8:15AM + 1 hour 22.5 min = **9:37 AM** or **9:38 AM**.	*9:37 AM or 9:38 AM*
15.	The net rate of filling is 30 – 5 = 25 gallons per minute. Total time to fill the tank: 1200 ÷ 25 = **48 minutes**.	*48 [minutes]*
16.	For the first 18 miles, Katie runs at 8 minutes per mile, so it takes her 18 × 8 = 144 minutes. The remaining distance: 26.2 – 18 = 8.2 miles. Thus, it takes her 8.2 × 10 = 82 minutes to complete the last 8.2 miles. Total time: 144 + 82 minutes = 226 minutes or **3 hours 46 minutes**.	*3 hours 46 minutes*
17.	Tracy listens to Chapter 4 at 1.2× speed, meaning the playback is **20% faster** than normal. To find the original time (which should be longer than 8.5 min), we multiply the time Tracy took to listen at 1.2x speed by 1.2. Time at normal speed = 8.5×1.2 = **10.2 minutes** Another way is to think about: 1 Chapter = Speed×Time. It is inverse variation (like speed and time for a fixed distance). The faster you listen, the less time it takes, the slower you listen the longer it will take. Chapter 4 = 1.2×8.5, it is the same as Chapter 4 = 1×**10.2,** so the regular speed it is **10.2 minutes.**	*10.2 [minutes]*

18.	To find time, we can divide the distance by the speed: Time = Distance/Speed. The time taken to walk to the grandparents' house: 1 km ÷ 4 km/h = 0.25 hours (15 min). He left at 9:15 AM, so he arrived at his grandparents' house at 9:30 AM. The time taken to return home: 1 km ÷ 3 km/h = 1/3 hours (20 min). Since he arrived home at 4 PM, he must have left his grandparents' house at 3:40PM. The time he spent: 3:40 PM – 9:30 AM = **6 hours 10 minutes**.	*6 hours 10 minutes*

Solution is available on April 4, 2025
www.mathinaction.org