

Math Challenge #13



**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.**

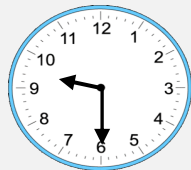
Answer

1.		Draw on the clock to the right using these clues: <ul style="list-style-type: none"> • This is the time when Maria has to get up in the morning. • She has exactly one hour to get ready before the bus picks her up at 9 a.m. 	
2.	Angela went to the park at 3 p.m. She then came home at 5 p.m. before dinner. How many hours did she spend at the park?		<i>2 hours</i>
3.		Leanne has a busy schedule on Friday. She has back-to-back activities at the community center with no break. She takes a dance class and has a 30-minute piano lesson. The clock on the left shows the time when Leanne's piano lesson ends. Her dance class lasts 1 hour. What time did she start her dance class?	<i>3:30 p.m.</i>
4.	Eva went to bed at 8 p.m. last night. She woke up at 6 a.m. today. How many hours did she sleep?		<i>10 hours</i>
5.		School starts at 9 a.m. How much time, in minutes , does Dahlia have if it is now a quarter before 8 a.m.?	<i>75 minutes</i>
6.	Roger did the following activities yesterday (one after another) without breaks as soon as he came home from school: <ul style="list-style-type: none"> - He did his homework for 30 minutes. - He read his book for 1 hour. - He ate his snack for 30 minutes. - Finally, at his backyard Roger shot some hoops with his neighbor, Jaisal, for 30 minutes. It is now 6 p.m. and it's time for dinner. What time did he come home from school?		<i>3:30 p.m.</i>
7.		A train service runs every 15 minutes. If there is a train at 6:25 a.m., how many trains are there between 6 a.m. and 9 a.m. altogether?	<i>12 trains</i>
8.	A movie ran for 115 minutes and finished at 10:15 p.m. At what time did the movie begin? <i>120 minutes before 10:15p.m. was 8:15 p.m. 115 min is 5 minutes less than 120 minutes. Five minutes after that time was 8:20 p.m. Therefore, 115 minutes before 10:15pm was 8:20 p.m.</i>		<i>8:20 p.m.</i>

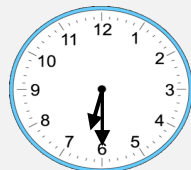
9. How many minutes pass starting from 10:35 p.m. on Saturday until to 1:27 a.m. the next day? *172 minutes.*
 From 10:35 pm to midnight, there's 1 hour and 25 minutes or 85 minutes. From midnight to 1:27 a.m., there are 87 minutes. So, total minutes passed is $85 + 87 = 172$ minutes.

10. Arjun took 3 hours and 20 minutes to work on ten challenging math problems. Max solved the same problems 45 minutes faster than Arjun. Both of them started working on the problems at 1:30 p.m. At what time did Max finish solving the problems? *4:05 p.m.*
 $3:20 - 0:45 = 2\text{h } 35\text{ min}$ Max was solving the problems
 $1:30\text{ pm} + 2\text{ h } 35\text{ min} = 4:05\text{ pm}$

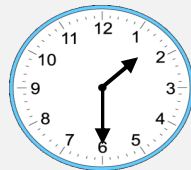
These clocks show the times in four cities of the same time.



Seattle
Sat, 9:30 p.m.



Geneva
Sun, 6:30 a.m.



Singapore
Sun, 1:30 p.m.



Sydney
Sun, 4:30 p.m.

Use the above information to solve problem 11, 12 and 13.

11. If it is 6 a.m. in Singapore on Monday, what is the time and day in Geneva? *Geneva is 6:30 am which is 7 hours earlier than Singapore. $6\text{ am} - 7\text{ hours} = 11\text{pm}$ (on Sunday)* *11:00 p.m.*

12. If it is 10:25 a.m. in Sydney, what is the time in Singapore? *Sydney is 4:30 pm which is 3 hours later than Singapore. Thus, $10:25\text{ am} - 3\text{ h} = 7:25\text{ am}$* *7:25 a.m.*

13. Jack flew from Seattle to Singapore. The flight took off at 10:20 a.m. on Monday and arrived in Singapore at 5:30 p.m. the next day. How long was the flight? *We need to convert the time consistent with one city. Let's convert the starting time of flying out to Singapore time. From 9:30 pm to midnight is 2h 30 min, and in Singapore it is 13 hours 30 min. So, the difference in time is 16 hours. $10:20\text{ am} + 16\text{ hours} = 10:20\text{ am} + 12 + 4\text{ hours} = 10:20\text{ pm} + 4 = 10:20\text{ pm} + 1:40 + 2:20 = 2:20\text{ am}$ (Singapore time)
 $5:30\text{ pm} - 2:20\text{ am} = \text{military time} = 17:30 - 2:20 = 15\text{ hours } 10\text{ min}$* *15 hours 10 min*


14. At the end of a power outage, a digital clock reset to 12:00 midnight. In the morning, after the power outage occurred, the digital clock showed 4:50 a.m. while the actual time was 9:30 a.m. At what time did the power outage end? *4:40 a.m.*
 The power outage ended 4 hours and 50 minutes ago. Subtract 4 hours and 50 minutes from 9:30 a.m.

15. Water lilies are growing on Green Lake. The water lilies grow rapidly, so that the amount of water surface covered by lilies doubles every 24 hours. On the first day of summer, there was just one water lily. On the 90th day of the summer, the lake was entirely covered. On what day was the lake half covered? *89th day*
 Every day the number of lilies doubles. If the lake was full on the 90th day, then it was half full on 89th day

16. At 3:00 p.m. an analogue clock shows the correct time. The second analogue clock is broken so that, for every hour that passes, the clock will be 12 minutes behind. For example, at 4:00 p.m. the clock will show 3:48 p.m. In how many hours will it next show the correct time? *60 hours*
 Hint: make a chart or a table.
 Start building the table and notice the pattern

Correct clock	3pm	4pm	5pm	6pm	7pm	8pm
broken	3pm	3:48 pm	4:36 pm	5:24pm	6:12pm	7pm

The difference between two neighboring columns is 12 minutes. So, for the clocks to show the same time it means one will be showing am time, the other pm time. Thus, the difference will be 12 hours. Now convert 12 minutes into the hours = $1/5\text{ h}$. $12 \div \frac{1}{5} = 60$ in 60 hours they will show the correct time again

17.	<p>When it is Sunday at 7 a.m. in Boston, it is Sunday at noon in London. A plane leaves London at noon London time and arrives in Boston at 11 a.m. Boston time the same day. A second plane leaves Boston at noon, Boston time, heading to London. Assuming both planes fly for the same number of hours, what time in London is it when the second plane arrives?</p> <p>Convert all times to London time. The difference in time between these two cities is $12 - 7 = 5$ hours. Plane 1 arrives in at 11 a.m. Boston time, which is 4 p.m. London time, therefore it was 4 hours flight. The second plane leaves Boston at noon, Boston time, which is 5 p.m. London time. Since the travel time is 4 hours, therefore it is 9 p.m. in London when the second plane arrives.</p>	9:00 p.m.
18.	<p>A digital timer counts down from 3 minutes (03:00) to 0 (0:00), one second at a time. How many times during the countdown does at least one of the three digits show a 2? <i>Hint: make a chart or an organized list.</i></p> <p>Time intervals: 2:59 to 2:00 → 60 times 1:59 to 1:00 → 1:29 through 1:20; and 1:52, 1:42, 1:32, 1:12, 1:02 → 15 times 0:59 to 0:00 → 0:29 through 0:20; and 0:52, 0:42, 0:32, 0:12, 0:02 → 15 times Total: 90 times</p>	 <p>90 times</p>

Solution is available on April 23, 2020 at www.mathinaction.org