

Math Challenge #14

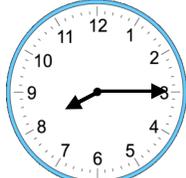
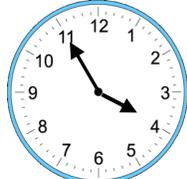


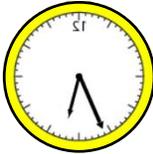
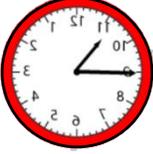
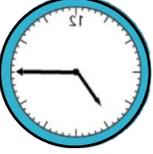
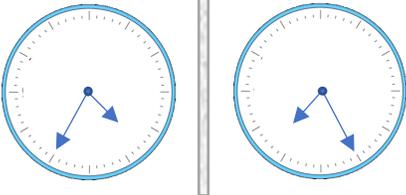
First Name: _____	Last Name: _____	Grade: _____
Teacher: _____	Parent's email: _____	

Analog and Digital Clocks

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

<p>1. Draw on the clock the correct hour hand and minute hand using the following clues:</p> <ul style="list-style-type: none"> This is the time when Nozomi has to get up in the morning. He has exactly one hour to get ready before his online class begins at 9 am. 	
<p>2. Tiara is sick and is prescribed to take a pill every 4 hours. The last time she took a pill was 11 o'clock in the morning. At what time does she need to take another pill?</p>	<p><i>3 o'clock or</i> <i>3:00 p.m.</i></p>
<p>3. Eva went to bed at 8 p.m. last night. She woke up at 6 a.m. today. How many hours did she sleep?</p>	<p><i>10 [hours]</i></p>
<p>4. Ria 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 right after the dance class. The clock shows the time when Ria's piano lesson ends. Her dance class lasts 1 hour. What time did she start her dance class?</p>	 <p><i>3:30 p.m.</i></p>
<p>5.  School starts at 9:00 a.m. Renata glances at the clock and wonders how much time she has to get ready for school. Write your answer in minutes.</p>	<p><i>45 [minutes]</i></p>
<p>6. 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? <small>First train will be at 6:10 a.m. Then 6:25 a.m., 6:40 a.m., 6:55 a.m. 7:10 a.m., 7:25 a.m., 7:40 a.m., 7:55 a.m.; 8:10 a.m., 8:25 a.m., 8:40 a.m., 8:55 a.m. → 12 trains</small></p>	<p><i>12 [trains]</i></p>
<p>7.  How many minutes after the time shown is 4:45? <small>4:45 – 3:55 = 0:50 or 50 minutes</small></p>	<p><i>50 [minutes]</i></p>

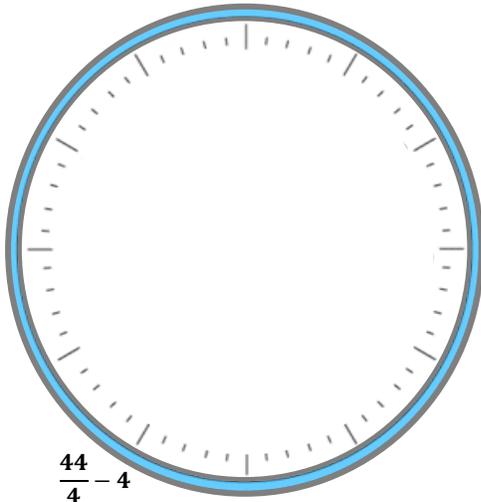
8.	<p>If the clock face broke into three pieces and the total of the numbers on each piece was the same, what would that total be?</p> <p>$1+2+3+4+5+6+7+8+9+10+11+12 = 78$ $78/3 = 26$</p>	26
9.	<p>If the clock face broke into two pieces and the sum of the numbers on each piece was the same, what other number would be on the piece containing the 11, 12, 1, 2 and 3?</p> <p>$1+2+3+4+5+6+7+8+9+10+11+12 = 78$ Each broken piece would have a sum of $78/2 = 39$ The other number in the question must be $39 - (11+12+1+2+3) = 10$</p>	10
10.	<div style="display: flex; align-items: center;">   <div style="margin-left: 20px;"> <p>If Shachika watched these two movies, back to back, and started at 7:15 p.m., what time did she finish the movies?</p> <p>Total movies minutes = 2 h 9 min + 1 h 58 min = 129 min + 60 min + 58 min = 247 min</p> <p>We then find out 247 minutes after 7:15 p.m.: 240 min = 4 hours. So, 4 h 7 min after 7:15p.m. is 11:22 p.m.</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  2h 9min </div> <div style="text-align: center;">  1h 58min </div> </div>	11:22 p.m.
11.	<p>I finished reading a book at 9:30 p.m. It only took me two and a quarter hours, and I read it without a break. What time did I start? 2 h 15 min before 9:30 p.m. is 7:15 p.m.</p>	7:15 p.m.
12.	<p>A shop that sells clocks and watches has 3 clocks displayed on one of the walls. As Mina faces the opposite of the wall, she can see the 3 clocks in a mirror displayed as below.</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <div style="margin-left: 400px;"> <p>a. Determine the time of each clock. b. Which clock will strike the hour first?</p> <p>a. Clock A: 5:34 Clock B: 10:45 Clock C: 7:15</p> <p>b. The one that will strike the hour first is Clock B.</p> </div>	<p>a. Clock A: 5:34 Clock B: 10:45 Clock C: 7:15</p> <p>b. Clock B</p>
13.	<p>The time shown by the reflection of an analog clock in a mirror is 4:35. What is the actual time in that clock?</p> <p>If you draw it, the actual time would be 7:25.</p> <div style="text-align: center; margin-top: 20px;">  </div>	7:25
14.	<p>At the end of a power outage, a digital clock resets 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?</p> <p>After the power outage the clock worked for 4 hours and 50 minutes. At 9:30 – 4:50 = 4:40 a.m. the power outage ended.</p>	4:40 a.m.

<p>15. Sometimes in the late 18th century, a decimal clock was proposed, in which there were 100 'minutes' in one 'hour' and 10 'hours' in one full day. Assuming that such a clock started from 0:00 at midnight, what time would it show when an ordinary clock showed 6 a.m.?</p> <p>6 hours = $\frac{1}{4}$ of 24 hours $\frac{1}{4}$ of 10 "hours" = 2.5 "hours" 2.5 "hours" = 2 "hours" and 50 "minutes"</p>	<p>2:50</p>
<p>16.</p> <div style="font-family: monospace; font-size: 2em; text-align: center;"> 01234 56789 </div> <p>Above are the ten digits used in a digital clock. Tanisha has a very cool 12-hour digital clock which shows the time, using four digits, on a piece of glass so it can be seen from both sides. For example:</p> <div style="text-align: center;"> front back 12:34 → 4E:51 </div> <p>At what time between 3 o'clock and 10 o'clock will the time look the same from both sides? Think about vertical line of symmetry where 0 and 8 are read as themselves (the same way), but 2 and 5 are swapped. Note that the digits are read in the opposite order. Since the time is before 10:00, the first hour digit must be a 0. When read from behind, this means the last digit must also be a 0. Since the time is between 3:00 and 10:00 and the second hour digit must be one that reads backwards as another digit, it must be either 5 or 8. Since 08:80 is not a valid time, the time must be 05:20.</p>	<p>05:20</p>
<p>17. When it is 7 a.m. in Boston, it is 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 amount of time, what time is in London, when the second plane arrives?</p> <p>There is 5 hours difference between London and Boston: noon – 7 a.m. = 5 hours. Convert all times to London time. Plane 1 arrives at 11 a.m. Boston time, which is 4 p.m. London time, therefore it was a 4 hour 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>	<p>9:00 p.m.</p>

18. Can you design a clock that only uses the digit 4?

For example, for 7 o'clock we can have $\frac{44}{4} - 4$.

Solution varies



Possible solution: So, every hour on the clock's face is written using only 4's

$$1 = 4 \div 4$$

$$2 = 4 \div 4 + 4 \div 4$$

$$3 = 4 - 4 \div 4$$

$$4 = 4$$

$$5 = 4 + 4 \div 4$$

$$6 = 4 + 4 \div 4 + 4 \div 4 \text{ or } = 4 + \sqrt{4}$$

$$7 = 4 + 4 - 4 \div 4$$

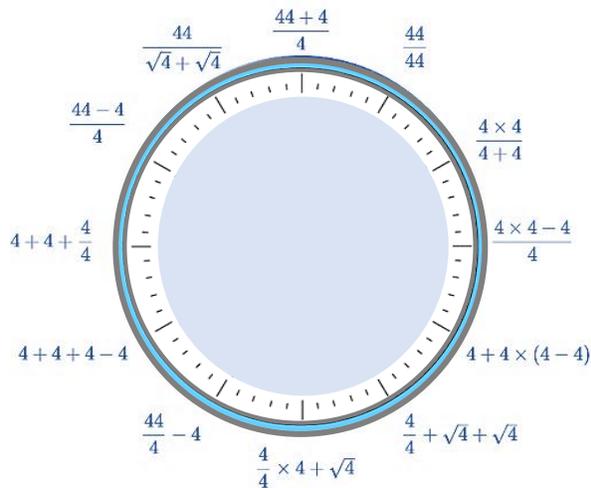
$$8 = 4 + 4$$

$$9 = 4 + 4 + 4 \div 4$$

$$10 = 4 + 4 + 4 \div 4 + 4 \div 4 \text{ or } 4 + 4 + \sqrt{4}$$

$$11 = 44 \div 4$$

$$12 = 4 \times (4 - 4 \div 4)$$



Solution is available on May 7, 2021 at www.mathinaction.org