

1. $10 : 12 : 15$

2. \$240

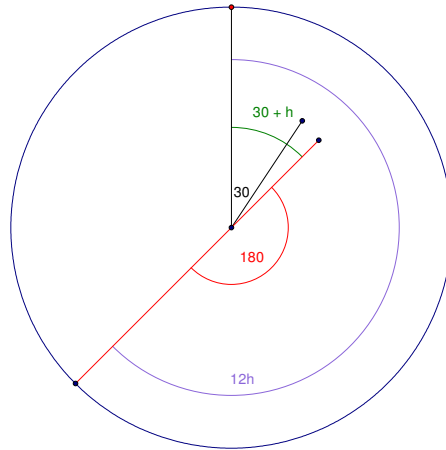
3. 56 cm

4. 99

5. .25 ft

6. 30

7. Let m, h be the rate at which the minute and hour hands move (in terms of degrees). Notice that for every 360 the minute hand moves (or 60 minutes), the hour hand moves 30 (or 1 hour). This gives us the following ratio: $\frac{m}{h} = \frac{360}{30}$. This means that $m = 12h$. Our clock is basically the circle below, with 12'o'clock being 0, the black lines representing our starting minute and hour hands, and the red lines representing the first time the after 1:00 that our minute and hour hands will be 180.



This means that while the hour hand moves h degrees, the minute hand will move $12h$ degrees. Since the hour hand starts at 30, and the minute hand starts at 0, after moving they will be at $30 + h$ and $12h$ respectively. We want the hands to form 180 so our equation is as follows:

$$12h - (30 + h) = 180$$

Solving, we get $h = \frac{210}{11}$. Since every 30 the hour hand moves gives us 60 minutes, this happens $2 \times \frac{210}{11} = \frac{420}{11} = 38\frac{2}{11}$ minutes later, which is approximately $1:38:11\text{PM}$.



Math Olympiad and Problem Solving Programs
E130 - Honors Geometry Problem Solving
Problem Set 8.1 - Ratio
Name: _____ Date: _____

8. $2 : 1$

9. $\$80$

10. $5 : 9 : 6$