

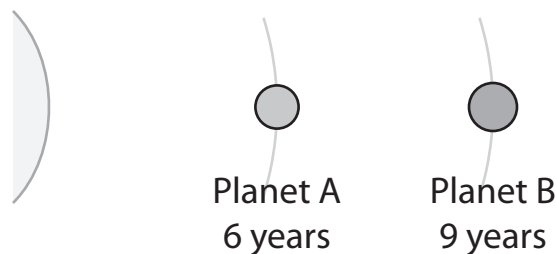
Name _____ ANSWER KEY _____ School Team _____

Event 5: Team Problems (with calculators)

5th/6th grade Math Meet '08

Problem 2: Planetary orbits

Here are two planets circling a star that are presently aligned:

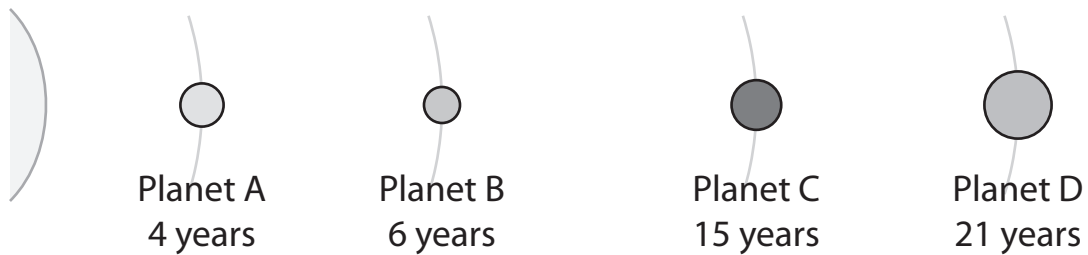


If planet A takes 6 Earth years to orbit the star, and planet B takes 9 Earth years to orbit the star, then the first time that both planets will return to this same position will be in 18 Earth years. Planet A will make 3 orbits, while planet B will make 2 orbits.

All of the following problems will deal with how long it takes planets to orbit.

Problem 2: Planetary orbits

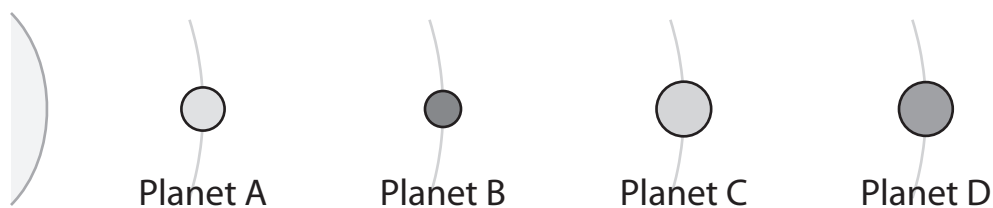
For the following problems, given the orbit times for each planet, determine the least number of Earth years it will take for the planets listed to be aligned in this same position. (1 pt. each)



- | | | |
|----|---|----------------------------|
| 1) | Planet A & Planet B | $\frac{12}{\text{years}}$ |
| 2) | Planet B & Planet C | $\frac{30}{\text{years}}$ |
| 3) | Planet C & Planet D | $\frac{105}{\text{years}}$ |
| 4) | Planet A & Planet B & Planet C | $\frac{60}{\text{years}}$ |
| 5) | Planet A & Planet B & Planet C & Planet D | $\frac{420}{\text{years}}$ |

Problem 2: Planetary orbits

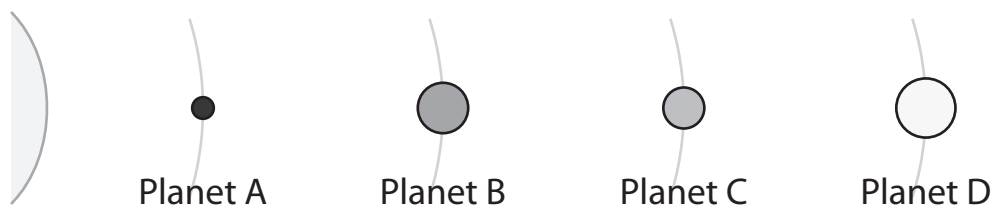
For the following problems, you are given the times of the innermost and outermost planetary orbits, along with the *minimum* times for some combinations of planets to be aligned in the same position. Find the times of the middle planetary orbits. Note that, because the orbits increase in size, the times of planetary orbits must be strictly increasing. (2 pts. each blank)



$$1) \quad 4 \text{ years} < \frac{6}{\text{years}} < \frac{10}{\text{years}} < 12 \text{ years}$$

$$\text{Planet B \& Planet C} = 30 \text{ years}$$

$$\text{Planet C \& Planet D} = 60 \text{ years}$$



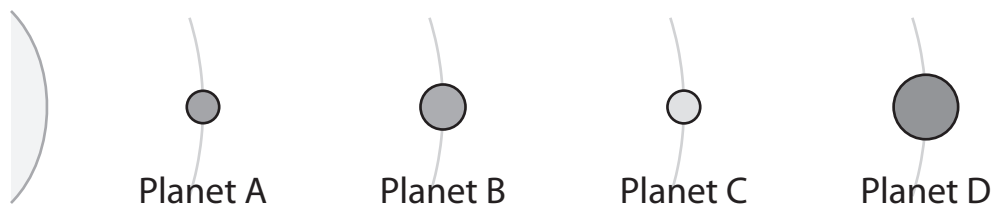
$$2) \quad 8 \text{ years} < \frac{14}{\text{years}} < \frac{35}{\text{years}} < 40 \text{ years}$$

$$\text{Planet B \& Planet C} = 70 \text{ years}$$

$$\text{Planet A \& Planet B} = 56 \text{ years}$$

Problem 2: Planetary orbits

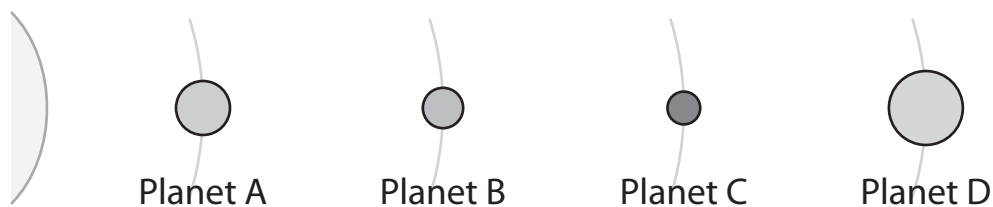
For the following problems, you are given the times of the innermost and outermost planetary orbits, along with the *minimum* times for some combinations of planets to be aligned in the same position. Find the times of the middle planetary orbits. Note that, because the orbits increase in size, the times of planetary orbits must be strictly increasing. (2 pts. each blank)



$$3) \quad 4 \text{ years} < \frac{11}{\text{years}} < \frac{15}{\text{years}} < 36 \text{ years}$$

$$\text{Planet B \& Planet C} = 165 \text{ years}$$

$$\text{Planet C \& Planet D} = 180 \text{ years}$$



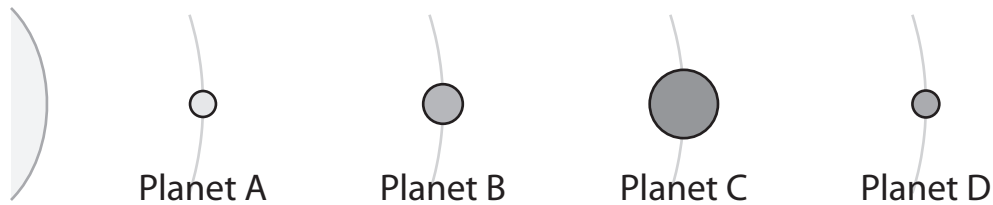
$$4) \quad 8 \text{ years} < \frac{30}{\text{years}} < \frac{35}{\text{years}} < 49 \text{ years}$$

$$\text{Planet B \& Planet C} = 210 \text{ years}$$

$$\text{Planet A \& Planet C} = 280 \text{ years}$$

Problem 2: Planetary orbits

For the following problems, you are given the times of the innermost and outermost planetary orbits, along with the *minimum* times for some combinations of planets to be aligned in the same position. Find the times of the middle planetary orbits. Note that, because the orbits increase in size, the times of planetary orbits must be strictly increasing. (2 pts. each blank)



$$5) \quad 12 \text{ years} < \frac{30}{\text{years}} < \frac{39}{\text{years}} < 75 \text{ years}$$

$$\text{Planet B \& Planet C} = 390 \text{ years}$$

$$\text{Planet A \& Planet C} = 156 \text{ years}$$

$$\text{Planet B \& Planet D} = 150 \text{ years}$$