

TEACHER ANSWER PAGE

Problem 1

$$\square 1 \square \square 4$$

$$\square 6 \square \square 3$$

$$\square 2 \square \square 5$$

$$\square 1 + \square 6 = \square 4 + \square 3$$

Problem 2

$$\square 1 \square \square 4$$

$$\square 2 \square \square 3$$

$$\square 1 + \square 2 \square \square 3 + \square 4$$

Problem 3

$$\square 1 \square \square 2$$

$$\square 3 \square \square 4$$

Side AB \square side AC

Problem 4

Note: The use of a calculator in the following steps presents a good opportunity to review the meaning of 'significant digits' and rounding. Calculators give far more significant digits in an answer than may be justified given the accuracy of the input numbers.

What is the Earth's diameter?

$$6378 \text{ kilometers} * 2 = 12756 \text{ kilometers}$$

If the distance from the Earth to the Sun is 150,000,000 kilometers, what is the measure of $\square X$?

$$\tan X = (6378) / (150,000,000)$$

$$\text{Inverse Tangent of } (6378 / 150,000,000)$$

$$\text{Angle } X = 0.00244$$

Problem 5

Can the measure of $\square Y$ be determined? Explain your reasoning.

The only information that is provided is the Earth's radius. Based on this, the measure of angle Y can not be determined. In order to determine angle Y, either the measure of angle X or the length of another side would have to be known.

The Earth's radius is 6378 km and $\square X$ is 0.00244 degrees, is it possible to determine the distance to the Sun?

Yes, it is possible to determine the distance to the Sun by using the tangent ratio.

$$\tan (0.00244) = 6378 / (\text{the distance to the Sun})$$

$$\tan (0.00244) * (\text{the distance to the Sun}) = 6378$$

$$\text{The distance to the Sun} = (6378) / (\tan(0.00244))$$

$$\text{The distance to the Sun} = 149767410.5 \text{ kilometers}$$

Note that the calculator will give many extra digits of apparent precision, even though the input number have at most only 4 significant digits (e.g the radius of Earth). The correct answer would be 149.8 million kilometers allowing for the number of actual significant digits.

The distance from the Earth to the Sun is approximately 150,000,000 kilometers.