Proportional and non-proportional situations name:

These situations are taken from an article by Kien H. Lim in the April 2009 issue of Mathematics Teaching in the Middle School. For each task, solve the problems, and find a way to check your answer by solving the problem another way. When you have solved all of the problem tasks, look back and answer which ones can be correctly solved by writing and solving a proportion. How are the proportional tasks different from the additive or subtractive tasks?

Task 1: A candle is burning at a constant rate. It has burned 12 mm after 20 minutes.

a. How many millimeters has the candle burned after 50 minutes?

b. Let *b* represent the number of millimeters the candle has burned after *t* minutes. Write an equation to relate *b* and *t*.

Task 2: A candle is burning at a constant rate. When it has burned 30 mm, its height is 75 mm.

a. When it has burned 60 mm, what will be the candle’s height?

b. Let *h* represent the candle’s height when it has burned *x* mm. Write an equation to relate *h* and *x*.

Task 3: An altar in a church needs to be lit continuously, using one special candle at a time, for a weeklong festival. If the church uses special candles that last 7 hours each, then 24 such candles will be needed.

a. If the church uses special candles that last 8 hours each, how many 8-hour candles will the church need?

b. Let *n* represent the number of special candles that the church needs, with each candle lasting *t* hours.

Write an equation to relate *n* and *t*.

Task 4: Two identical candles, A and B, lit at different times, are burning at the same constant rate. When candle A has burned 20 mm, candle B has burned 12 mm.

a. When candle B has burned 30 mm, how many millimeters will candle A have burned?

b. Let *a* represent the number of millimeters that candle A has burned when candle B has burned *b* mm. Write an equation to relate *a* and *b*.

Task 5: Two different candles, P and Q, lit at the same time, are burning at different, but constant, rates.

When candle P has burned 16 mm, candle Q has burned 10 mm.

a. When candle Q has burned 35 mm, how many millimeters will candle P have burned?

b. Let *p* represent the number of millimeters that candle P has burned when candle Q has burned *q* mm. Write an equation to relate *p* and *q*.

Analyze: which of these task situations was proportional (can be solved using a proportion)? How are the proportional problems different from the non-proportional problems?