Task A
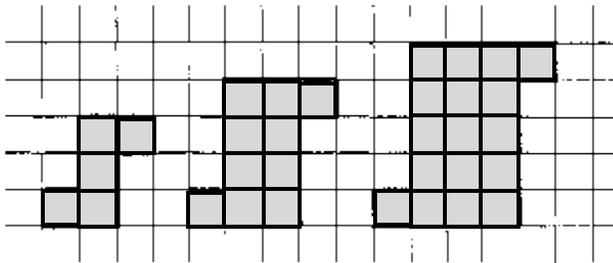
The first four terms in a sequence are shown below.

40, 8, 24,16,…

Each term after the first two terms is found by taking one-half the sum of the two preceding terms. Which term is the first odd number in this sequence?
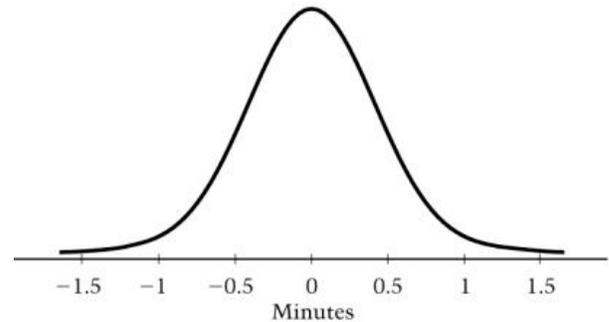
Task B

The first 3 figures in a pattern of tiles are shown below. The pattern of tiles contains 50 figures.

Describe the 20th figure in this pattern, including the total number of tiles it contains and how they are arranged. You may use drawings, words, and numbers in your explanation. Explain the reasoning that you used to determine this information. Write a description that could be used to define any figure in the pattern.
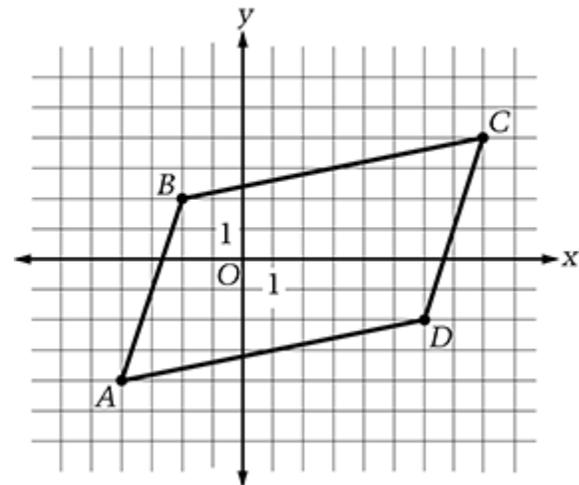
Task C

A clock manufacturer has found that the amount of time their clocks gain or lose per week is normally distributed with a mean of 0 minutes and a standard deviation of 0.5 minute, as shown below.

In a random sample of 1,500 of their clocks, what is the expected number of clocks that would gain or lose more than 1 minute per week?

Task D

In the figure above, the vertices of ABCD are (-4, -4), B(02, 2), C(8, 4) and D(6 , -2). Give a mathematical justification that ABCD is a parallelogram.

Task E

Solve the equation.

$$\left(x^2 - 5x + 5\right)^{x^2 + 9x + 20} = 1$$

Task F

You are given a $30 I-tunes gift card for your birthday. You purchase 6 songs for $4.50. At this rate, how many songs will you be able to download? What is the price of each song that you purchase? Provide an algebraic and graphical model to describe the situation. Explain what the real-world meaning of the slope is in the context of this problem? You may use drawings, words, and numbers in your explanation.

Task G

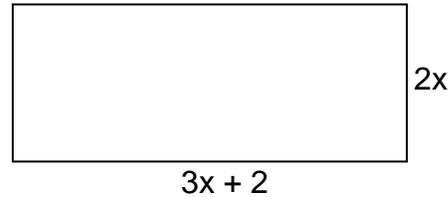Factor each of the following expressions. Explain the steps you used to factor each.

$x^2 + 7x - 18$

$3x^2 - 12x$

$2x^2 - x + 10$

Task H

The area of a rectangular dog pen is 170 ft^2. How much fencing would be needed to enclose the dog pen?

2x

3x + 2

Task I

A ship on the ocean surface detects a sunken ship on the ocean floor at an angle of depression of $50°$. The distance between the ship on the surface and the sunken ship on the ocean floor is 200 meters. If the ocean floor is level, how far above the ocean floor is the ship on the surface, to the nearest meter?

Task J

John left his house and walked 3 blocks to school, as shown in the graph. Describe a possible interpretation for each section of his trip.

Distance from John's house

D

B   C

A

Time