

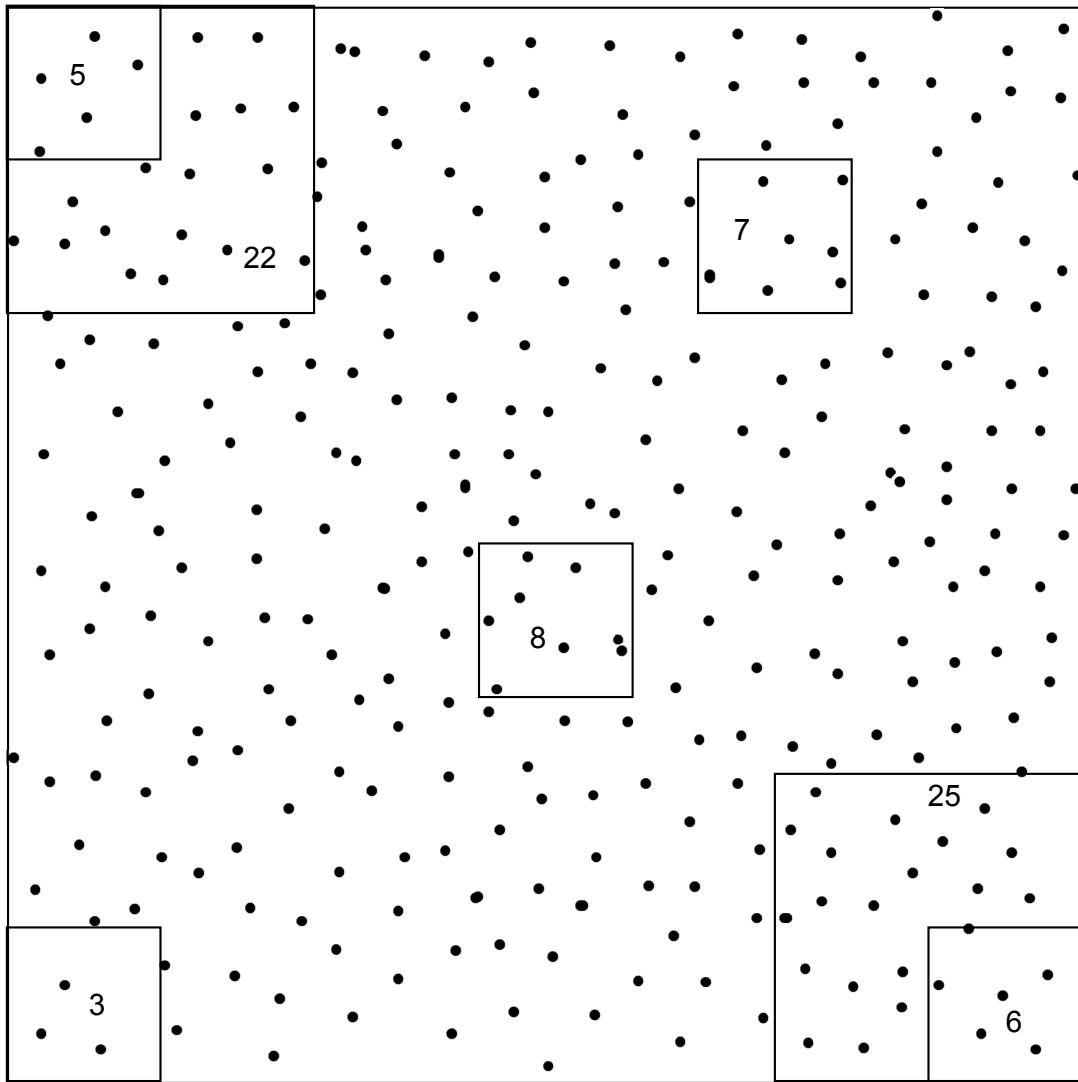


Grade 6 Math Circles Estimation Solutions

FEBRUARY 20, 2013

1. (a) 1 hour (c) 7 hours (e) 3 days
(b) 1 week (d) 2 minutes
2. (a) $\approx 19\text{cm} \times 15\text{cm} = 285\text{cm}^2 \pm 2\text{cm}^2$ (Actual: 286.08cm^2)
(b) Lowest: $285\text{cm}^2 \times 9\text{cm} = 2565\text{cm}^3$
Highest: $285\text{cm}^2 \times 10\text{cm} = 2850\text{cm}^3$
Halfway is about 2700cm^3 but we want a bit more than half. So a good estimate is $2730\text{cm}^3 \pm 30\text{cm}^3$ (Actual: 2746.368cm^3)
3. Activity. You may have a tape measure ready to see how close students were after all 3 estimates are given, though this is not required.
4. (a) Incorrect. 1110 (c) Correct. (e) Incorrect. \$4.50
(b) Correct. (d) Incorrect. 79 (f) Incorrect. 630

5. I drew many squares of the same size. The many smaller squares were easier to count the number of dots in them and quicker to make many of them, giving a fast and accurate estimate. The sides of the small squares were $\frac{1}{7}$ the length of the border so there were 49 squares in the region. There was an average of about 6 dots per square. So my estimate should be about $6 \times 49 = 294$. I'll estimate that there are 300 ± 50 dots.



6. Answers will vary

7. Answers will vary

8. (a) You have about 2h 10min to go. So you will arrive at 5:00pm \pm 15 minutes.
- (b) You need to assume that the speed limit doesn't change and your dad drives at about the same speed.
- (c) Sooner: increased speed, take a short cut off the main highway, if Mr. Auckland's house is actually just outside St. Thomas so you don't need to go into the city.
Later: Your Dad gets pulled over by a police officer for speeding, there might be a lot of stop signs or traffic lights before you get to Mr. Auckland's house, you get stuck in a traffic jam.
- (d) This will add about 20 minutes to the trip, but how long will it take to turn around, and will your Dad drive slower so he doesn't miss the turn again? We should add these factors to our error. So our new arrival will be 5:20 \pm 20 minutes.