

M111 Mathematics as a Human Pursuit Practice Partial Answer for Exam 3
Sections 5A and 5E
Sections 11A, 11C and 10C, Lab on Sound, and Fractal worksheets, Worksheets
on Fibonacci Numbers and Golden Ratio

Section 5A Fundamentals of Statistics

1. See text
2. a) Convenience b) systematic (explain each)
3. a) b) see text.
c) participation bias
4. experimental, controls groups used: cases – those who receive bees wax product;
controls: those who do not. Double blind.

Unit 5E Correlation and Causality

5. What type of correlation would you expect to see in each of these (weak, moderate, strong positive or negative, or none) – explain your answer.
a) strong negative
b) strong positive.
6. strong positive
7. widely scattered with random (no) pattern.
8. very weak negative correlation

Sound Lab and Unit 11a Mathematics and Music

9. a) 3 b) approximately 0.003 c) approx. 333
10. 2π a) 3 b) $2\pi/4$ c) $4/2\pi$ d) $3 \cos(4(x+\pi/2)-2)$
11. $256 \cdot 2^{(5/12)} = \text{approx } 342$

Unit 11C and Fibonacci Numbers Worksheet

12. 3, 5, 8, 13, 21, ...
13. a
14. Φ (Phi)

15. d

16 See text

17. shorter is $4 - 4/\Phi = \text{approx } 1.54$; longer is $4/\Phi = \text{approx } 2.46$

18. (length of whole line) / (length of longer)

Unit 10C Fractal Geometry

19. b

20. As in class

21. d

22. 1.16

Mandelbrot Worksheet

23. See worksheet notes or online

24. See worksheet notes or online.

25. a) $6 - 5i$

b) $24 - 12i$

26. a) $i, -1 + i, -i, \dots$ (cycles with period 2)

b) Yes

c) escapes to infinity.

d) No.

e) $7; 3/7$

f) $5, 2/5$