

Math 110 Common Final Answers Fall 2024

1. (a)

$$C = \begin{cases} 40 & 0 \leq x \leq 15 \\ 40 + 2x & 15 < x \leq 45 \end{cases}$$

(b) $[0, 45]$

(c) Only the range. The largest group size is still 45, but it now costs more per person

2. (a) Concave up as $a = 2 > 0$

(b) 3 and 6

3. $g(x) = f(x + 2) - 5$

4. (a) $t = \frac{200}{\sqrt{w}}$

(b) $t = \frac{200}{18} \approx 11.11$ minutes

5. $f(x) = (x + 1)(x - 3)$ or $f(x) = x^2 - 2x - 3$

6. (a) $R(t) = 10000 - 300t$

(b) $R(t) = 10000(1.12)^t$

(c) $t \approx 9.69 \rightarrow 10$. So, 2034

7. About 10.24 years

8. (a) $f(x) = 2x - 5$

(b) $f(x) = 3(2)^x$

9. (a) i. \$23,185.48

ii. \$23,223.68

iii. \$23,236.68

(b) The account that is compounding continuously

10. (a) -15

(b) e^{-4x+3}

11. (a) Exponential decay as $b = 0.97 < 1$

(b) 182

(c) -3%

(d) All real numbers

(e) All positive numbers

(f) $Q = 182e^{-0.0305t}$

12. (a) 1116 people

(b) $\frac{\ln(P/700)}{\ln(1.06)}$

(c) About 6 years

(d) The population will hit 1000 in the year 2030 (6 years after 2024)

13. (a) 0

(b) ∞