Math 118 Common Final Answers

1. (a) $S(t) = 1000 + 200t$
   (b) $S(t) = 1000 \cdot 1.149^t$
   (c) $t \approx 8$, so 2027
2. 2.50 years
3. (a) i. 11,248.64
      ii. 11,274.97
      iii. 11,274.97
   (b) The account that compounds continuously. It has the fastest growth rate
4. (a) exponential decay as the continuous growth rate k is negative
   (b) a=42,
   (c) $k = -18.2\%$
   (d) Domain is all real numbers
   (e) Range is all positive numbers
   (f) $Q = 42 \cdot 0.8336^t$
5. (a) $y = -4.2\cos(\frac{\pi}{6}t) + 6$
   (b) $y = \frac{6}{\pi}\cos(1/4.2) \approx 2.54$ hours after midnight on January 9th
6. $-2\cos(\pi t) - 1$
7. (a) 4/5
   (b) -4/3
   (c) $\frac{4+3\sqrt{3}}{10}$
8. (a) omitted
   (b) $300/sin(40^\circ) \approx 466.72$ feet
   (c) $300/\tan(40^\circ) \approx 357.53$ feet
9. (a) -2
   (b) e^{15x+8}
10. (a) $f(6) \approx 61$. In 2029, about 61 students live in the dorms
    (b) $\frac{\ln(P/200)}{\ln(0.82)} \approx 3$ or $\frac{\log(P/200)}{\log(0.82)} \approx 3$
    (c) It will take about 3 years for the dorm population to decrease to 100 students
11. There are many correct answers. One is $u(x) = \frac{5}{x}, v(x) = \sqrt{3x+1}$
12. (a) $(2, \frac{\pi}{3})$
    (b) $(0, 4)$
13. About 71.56 meters