Section 4.2 2, 3, 7, 12, 17, 20, 25, 28, 33, 38, 43, 46, 49

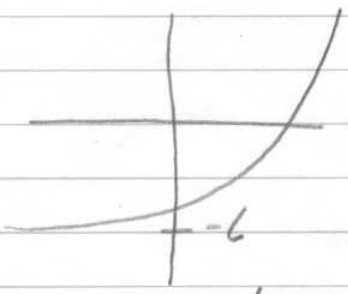
2) a) $\frac{1}{\sqrt{e}} = \frac{1}{e^{1/2}} = e^{-\frac{1}{2}}$

b) $\sqrt{e^5} = (e^5)^{\frac{1}{2}} = e^{5/2}$

3) a) $3(e^3)^2 = 3e^{3 \cdot 2} = 3e^6$

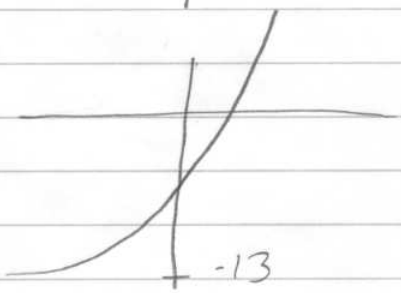
b) $\frac{14e^6}{7e^3} = 2e^{6-3} = 2e^3$

7)



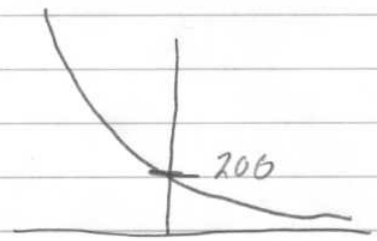
The graph is $y = e^x$ shifted down by 6 units.

12)



The graph is $y = e^x$ shifted down 13 and left 2.

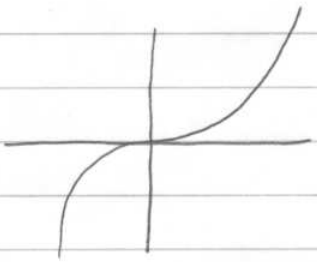
17)



The graph is $y = e^x$ stretched vertically by 200, reflected across the y-axis, and stretched horizontally by 2.

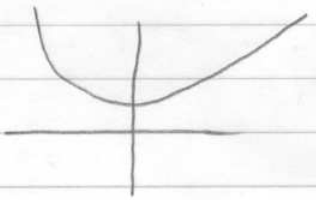
20) $\$1575(1 + 0.12)^2 = \$1766$

25)



$y \to \infty$ as $x \to \infty$

$y \to -\infty$ as $x \to -\infty$

28) 

$y \to \infty$ as $x \to 0$
$y \to \infty$ as $x \to -\infty$

33) a) $P(6) = 14.7\, e^{-0.203 \cdot 6} = 4.34$
b) $P(0) = 14.7$
c) 14,000 ft = 2.651 mi.
$P(2.651) = 14.7\, e^{-0.203 \cdot 2.651} = 0.992$

38) a) $A(t) = 220\, e^{-0.0248t}$
b) $A(10) = 220\, e^{-0.0248 \cdot 10} = 171.679$

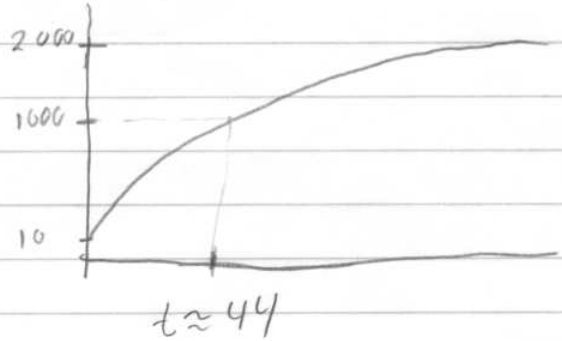
43) a) $(155 - 70)e^{-0.045t} + 70 = 85e^{-0.045t} - 70 = A(t)$
b) $A(10) = 85e^{-0.045 \cdot 10} - 70 = 124.198$
c) Graphically: $t \approx 11.8$

46) a) $(37 - 21)\, e^{-0.41t} + 21 = 16e^{-0.41t} + 21 = A(t)$
b) Want to solve $A(t) = 28$.

→ Murder happened at 10 pm.

49) a) $f(7) = \frac{2000}{1 + 199\, e^{-0.7}} = 23$ infected

b) Want to solve $f(t) = 1000$



$t \approx 44$ days