① (a) $y = 40{,}000 + 25x$.

(b) The y-intercept is 40,000

(c) ~~The~~ The slope is 25.

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② (a) $A(t) = 100(1.04)^t$

(b) $A(5) = 100(1.04)^{20} \overset{\$}{=} 219.11$

(c) $\frac{219.11 - 100}{20} \overset{\$}{\approx} 5.96$ per year.

(d) $A(\overset{19}{\cancel{2034}}) \overset{\$}{\approx} 210.68$

$\frac{A(\overset{20}{\cancel{2035}}) - A(\overset{19}{\cancel{2034}})}{2035 - 2034} = A(20) - A(19) \overset{\$}{\approx} 8.43$

(e) The rate of change is more rapid as time progresses, since $A(t)$ has a graph that is concave up.

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③ (a) The fixed cost is \$3000 and the unit cost is \$5.

Thus, $C(n) = 3000 + 5n$

(b) The revenue is $R(n) = 25n$.

(c) The profit is $\pi(n) = R(n) - C(n) = 20n - 3000$

The break-even point is where $\pi(n) = 20n - 3000 = 0$,

giving $n = \frac{3000}{20} = 150$.

Thus, 151 people would need to register to have some money left over

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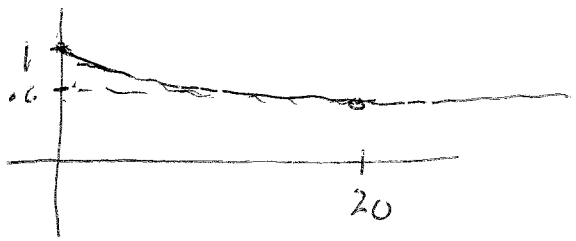
(4) (a) $P = (1-.025)^t = (0.975)^t$

(b)



(c) $(0.975)^t = 0.5 \qquad t \ln(.975) = \ln(0.5)$

$t = \ln(0.5)/\ln(0.975) \approx 27.38$ years

(d) $P(100) \approx (.975)^{100} \approx 7.95\%$