8) a) i) $f(x) = e^{-3x} \Rightarrow f'(x) = -3e^{-3x}$

ii) $g'(x) = \cos(x - \pi/3)$

b) Differentiate using the product rule

u	v
e^{-3x}	$\sin(x-\pi/3)$
$-3e^{-3x}$	$\cos(x-\pi/3)$
u'	v'

then $uv' + u'v = e^{-3x}\cos(x-\pi/3) - 3e^{-3x}\sin(x-\pi/3)$

so $h'(\pi/3) = e^{-3\pi/3}\cos(0) - 3e^{-3\pi/3}\sin(0) = \underline{\underline{e^{-\pi}}}$

Section B

9) a)

3, 9	4, 9	5, 9
3, 10	4, 10	5, 10
3, 10	4, 10	5, 10

b) 12, 13, 14, 15

c) $p(12) = 1/9$, $p(13) = 3/9 = 1/4$, $p(14) = 3/9$, $p(15) = 2/9$

d) $E(S) = \Sigma S\, p(S)$

$= 12 \times 1/9 + 13 \times 3/9 + 14 \times 3/9 + 15 \times 2/9$

$= 123/9 = 13.6\dot{6}$

e) For 1 game she expects to win

$50 \times p(\text{even}) - 30 \times p(\text{odd})$

$= 50 \times 4/9 - 30 \times 5/9 = \frac{200}{9} - \frac{150}{9} = \frac{50}{9}$

$\therefore$ For 36 games she expects to win

$36 \times \frac{50}{9} = 200$ dollars