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SE-441
Assignment #1

1.

$$\text{downtime cost} = \text{deployment frequency} \times \text{change failure rate} \times \text{mean time to recover} \times \text{hourly outage cost}$$

a. $24 \cdot 10\% \cdot 8 \cdot 25{,}000 = \$480{,}000$

$24 \cdot 15\% \cdot 2 \times 25{,}000 = \$180{,}000$

$\$480{,}000 + \$180{,}000 = \boxed{\$660{,}000}$

b.

$24 \cdot x \cdot 8 \cdot 25{,}000 + 24 \cdot y \cdot 2 \cdot 25{,}000 = 250{,}000$

$24(x \cdot 8 \cdot 25 + y \cdot 2 \cdot 25) = 25\ 10$

$24 \cdot 2(4x + y) = 10\ 5$

$$\begin{cases} 24(4x+y) = 5 \\ \frac{x}{y} = \frac{2}{3} \end{cases} \qquad 6 \cdot \frac{2}{3} = \frac{8}{3}$$

$24\left(\frac{8}{3} \cdot y + y\right) = 5$

$24 \cdot \frac{11}{3} y = 5$

$y = \frac{5 \cdot 3}{24 \cdot 11} = \frac{5}{88} = 5.7\%$

$x = \frac{2}{3} \cdot \frac{5}{88} = \frac{5}{3.44} = \frac{5}{132} = 3.8\%$

longer
$24 \cdot \underline{0.03787879} \cdot 8 \cdot 25{,}000 = 181{,}818.192$

shorter
$24 \cdot \underline{0.05681818} \cdot 2 \cdot 25{,}000 = 68{,}181.816$

$181{,}818 + 68{,}181 = 250{,}000$

[5.7% Change failure rate for shorter
3.8% Change failure rate for longer]

2.

a. cost of excess rework = tech staff size · average salary · benefits mutiplier · % of time spent on excess rework.

$\boxed{\$2,240,000} = 250 \cdot 80,000 \cdot 1.4 \cdot 8\%$.

b.

$1,740,000 = 250 \cdot 80,000 \cdot 1.4 \cdot y$

$1,740,000 = 28,000,000$

2,240,000 − 500,000 = 1,740,000

$\frac{1,740,000}{28,000,000} = y = 0.06214286$

$\boxed{y = 6.2\%}$.