Quick Questions 10   Continuous Normal Probability Distributions

I. The average income of 30-year-old college graduates from State University is normally distributed with a mean of $30,000 and a standard deviation of $4,000. Calculate the following being sure to graph each question.
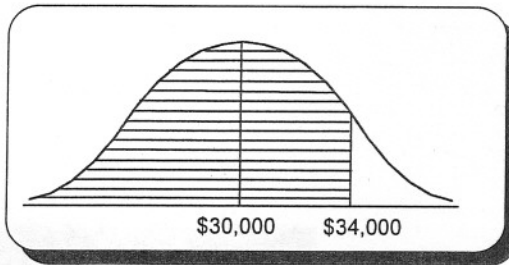
A. $P(x < \$34,000)$

$P(\$30,000 < x \le \$34,000)$

$$Z = \frac{x - \mu}{\sigma}$$

$$= \frac{\$34,000 - \$30,000}{\$4,000}$$

$$= \frac{\$4,000}{\$4,000}$$

$$= 1 \rightarrow .3413$$

$$\$30,000 \qquad \$34,000$$

$P(x < \$30,000) = .5000$

$P(x < \$34,000) = .3413 + .5000 = .8413 \rightarrow 84.13\%$

B. $P(x > \$38,000)$

$$Z = \frac{x - \mu}{\sigma}$$

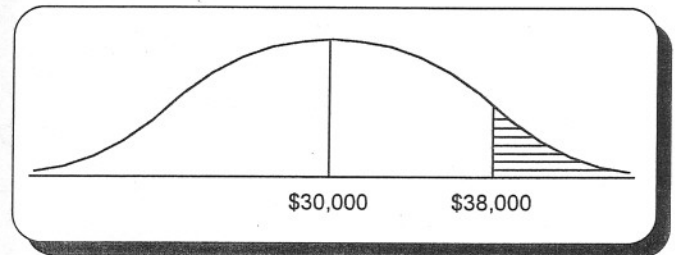$$= \frac{\$38,000 - \$30,000}{\$4,000}$$

$$= \frac{\$8,000}{\$4,000}$$

$$= 2.0 \rightarrow .4772$$

$$\begin{array}{r} .5000 \\ - .4772 \\ \hline .0228 \end{array}$$
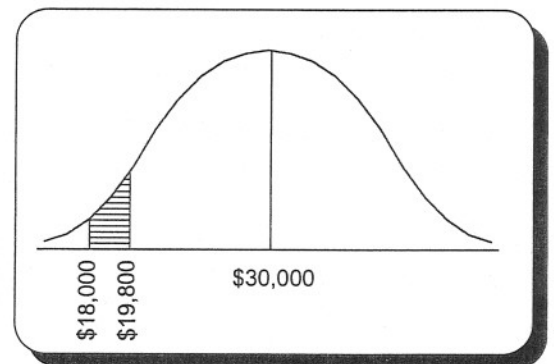
or 2.28%

$$\$30,000 \qquad \$38,000$$

C. $P(\$18,000 \le x < \$19,800)$

$$Z = \frac{x - \mu}{\sigma} = \frac{\$18,000 - \$30,000}{\$4,000} = \frac{-\$12,000}{\$4,000} = -3.00 \rightarrow .4987$$

$$Z = \frac{x - \mu}{\sigma} = \frac{\$19,800 - \$30,000}{\$4,000} = \frac{-\$10,200}{\$4,000} = -2.55 \rightarrow .4946$$

$$.4987 - .4946 = .0041 \rightarrow .41\%$$

$$\$18,000 \quad \$19,800 \qquad \$30,000$$

D. $P(x > \$30,000)$

$P(x > \$30,000) = 50\%$

$$\$30,000$$