Problem Set #8
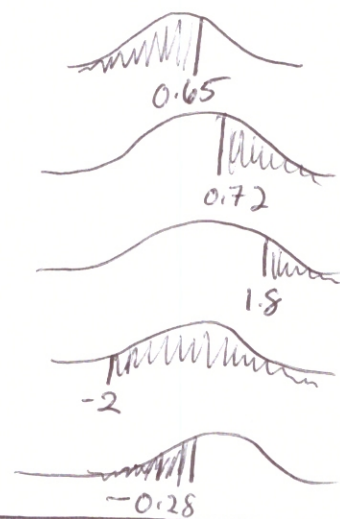
15 H

(5) a) $P(Z < 0.65) \approx 0.742$ (3SF)

b) $P(Z > 0.72) \approx 0.236$ (3SF)

c) $P(Z \geq 1.8) \approx 0.0359$ (3SF)

d) $P(Z > -2) \approx 0.977$ (3SF)

e) $P(Z \leq -0.28) \approx 0.390$ (3SF)

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(7) a) $P(|Z| < 0.4)$

$= P(-0.4 < Z < 0.4) =$

b) $P(|Z| > 1.24)$

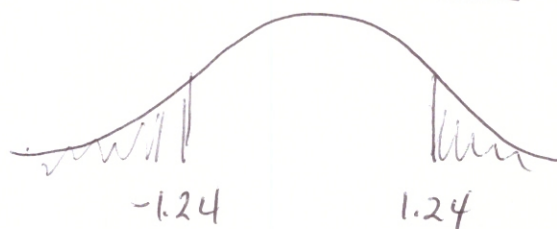$= P(Z < -1.24 \text{ and } Z > 1.24) = P(Z < -1.24) + P(Z > 1.24)$

or $1 - P(-1.24 < Z < 1.24)$ $\quad\quad 0.107488 \quad\quad + 0.107488$

$1 - 0.785024$

$\boxed{0.215 \text{ (3SF)}}$ Same answer $\longrightarrow$ $\boxed{0.215 \text{ (3SF)}}$

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15 I	b) $P(x > 9)$	c) $P(9 \leq x < 12)$
① $\quad X \sim N(14, 5^2)$	$Z = \dfrac{x - \mu}{\sigma} = \dfrac{9 - 14}{5} = -1$	$Z = \dfrac{9 - 14}{5} = -1$
$\mu = 14$	$P(Z > -1) \approx \boxed{.159}$	$Z = \dfrac{12 - 14}{5} = -.4$
$\sigma = 5$		
a) $P(x < 16)$	d) $P(x < 14)$	$P(-1 < Z < .4)$
$Z = \dfrac{x - \mu}{\sigma} = \dfrac{16 - 14}{5} = .4$	$P(Z < 0)$	$\approx \boxed{.186}$
$P(Z < .4) \approx \boxed{.655}$	$\approx \boxed{.5}$	

15I cont...

② $X \sim N(48, 81)$

$\mu = 48$

$\sigma = 9$

a) $P(X < 52)$

$Z = \dfrac{52-48}{9} = \dfrac{4}{9}$

$P(Z < 4/9) \approx \boxed{.672}$

b) $P(X \geq 42)$

$Z = \dfrac{42-48}{9} = -\dfrac{2}{3}$

$P\left(Z > -\dfrac{2}{3}\right)$

$\approx \boxed{.748}$

c) $P(37 < X < 47)$

$Z = \dfrac{37-48}{9} = -1$

$Z = \dfrac{47-48}{9} = -\dfrac{1}{9}$

$P\left(-1 < Z < -\dfrac{1}{9}\right)$

$\approx \boxed{.297}$

③ $X \sim N(3.15, 0.02^2)$

$\mu = 3.15$

$\sigma = 0.02$

a) $P(X < 3.2)$

$Z = \dfrac{3.2-3.15}{0.02} = 2.5$

$P(Z < 2.5) \approx \boxed{.994}$

b) $P(X \geq 3.11)$

$Z = \dfrac{3.11-3.15}{0.02} = \dfrac{.04}{.02} = 2$

$P(Z > 2) \approx \boxed{.0228}$

c) $P(3.1 < X < 3.15)$

$Z = \dfrac{3.1-3.15}{0.02} = -2.5$

$Z = \dfrac{3.15-3.15}{0.02} = 0$

$P(-2.5 < Z < 0) \approx \boxed{.434}$