Math 3339 Name: SOLUTION

Quiz #6

To compute the solutions, you can use the commands `pnorm` and `qnorm` in R. Please, write legibly and report the R command you use with all parameters. Please round your numerical solutions to 3 decimal digits.

(1)[5 Pts] Let X be a normal random variable with mean 5 and standard deviation 2. Calculate the following probabilities

(a) $P(X > 4)$;
(b) $P(|X - 5| \leq 2)$;

(a) R solution:

```
> 1- pnorm(4,mean=5,sd=2)
```

[1] 0.691

(b)] $P(|X - 5| \leq 2) = P(-2 \leq X - 5 \leq 2) = P(3 \leq X \leq 7)$

R solution:

```
> pnorm(7,mean=5,sd=2)-pnorm(3,mean=5,sd=2)
```

[1] 0.683

(2)[5 Pts] Determine the value of the constant c such that

(a) $P(0 \leq Z \leq c) = 0.360$;
(b) $P(|Z| \leq c) = 0.120$;

(a) $P(Z \leq c) = P(Z \leq 0) + P(0 \leq Z \leq c) = 0.500 + 0.360 = 0.860$.

Using R:

```
> qnorm(0.860)
```

[1] 1.080

(b) $P(|Z| \leq c) = P(-c \leq Z \leq c) = P(Z \leq c) - P(Z \leq -c) = 2P(Z \leq c) - 1$.
$P(Z \leq c) = \frac{1}{2}(1 + P(|Z| \leq c)) = \frac{1+0.120}{2} = 0.560$

Using R:

```
> qnorm(0.560)
```

[1] 0.151