

1.(1 pt) Find the following probabilities for the standard normal random variable  $z$ :

- (a)  $P(-1.09 \leq z \leq 0.64) =$  \_\_\_\_\_
- (b)  $P(-0.59 \leq z \leq 0.59) =$  \_\_\_\_\_
- (c)  $P(z \leq 1.75) =$  \_\_\_\_\_
- (d)  $P(z > -0.009999999999999999) =$  \_\_\_\_\_

**WARNINGS:**

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* This option —8— is not recognized in this subroutine
HASH(0x8bfedac) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 27
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
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/welcomeAction.pl line 590
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/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160
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HASH(0x8bfedac) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
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##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 30
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
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```

2.(1 pt) Assume that the readings on the thermometers are normally distributed with a mean of  $0^\circ$  and a standard deviation of  $1.00^\circ\text{C}$ . A thermometer is randomly selected and tested. Find the probability of each reading in degrees.

- (a) Between 0 and 0.31: \_\_\_\_\_
- (b) Between  $-1.87$  and 0: \_\_\_\_\_

- (c) Between  $-2.2$  and 1.68: \_\_\_\_\_
- (b) Less than  $-0.68$ : \_\_\_\_\_
- (c) Greater than  $-2.02$ : \_\_\_\_\_

**WARNINGS:**

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* This option —8— is not recognized in this subroutine
HASH(0x8c11690) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 137) line 64
— main::normal_prob called at (eval 53) line 30
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
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/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 137) line 64
— main::normal_prob called at (eval 53) line 31
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
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HASH(0x8c11690) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 137) line 64
— main::normal_prob called at (eval 53) line 32
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
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HASH(0x8c11690) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TTTT = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
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— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 137) line 64
— main::normal_prob called at (eval 53) line 33
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HASH(0x8c11690) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
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```

3.(1 pt) Find the value of the standard normal random variable  $z$ , called  $z_0$  such that:

(a)  $P(z \leq z_0) = 0.7164$

$z_0 =$  \_\_\_\_\_

(b)  $P(-z_0 \leq z \leq z_0) = 0.6184$

$z_0 =$  \_\_\_\_\_

(c)  $P(-z_0 \leq z \leq z_0) = 0.836$

$z_0 =$  \_\_\_\_\_

(d)  $P(z \geq z_0) = 0.2037$

$z_0 =$  \_\_\_\_\_

(e)  $P(-z_0 \leq z \leq 0) = 0.0043$

$z_0 =$  \_\_\_\_\_

(f)  $P(-1.58 \leq z \leq z_0) = 0.9038$

$z_0 =$  \_\_\_\_\_

**WARNINGS:**

\* This option —8— is not recognized in this subroutine  
 HASH(0x8c1539c) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 33  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
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 /welcomeAction.pl line 160

4.(1 pt) Assume that the readings on the thermometers are normally distributed with a mean of  $0^\circ$  and a standard deviation of  $1.00^\circ\text{C}$ .

Find  $P_{45}$ , the 45<sup>th</sup> percentile.

This is the temperature reading separating the bottom 45 % from the top 55 %.

5.(1 pt) Suppose that the readings on the thermometers are normally distributed with a mean of  $0^\circ$  and a standard deviation of  $1.00^\circ\text{C}$ .

If 11% of the thermometers are rejected because they have readings that are too high, but all other thermometers are acceptable, find the reading that separates the rejected thermometers from the others.

6.(1 pt)

For a normal distribution, find the percentage of data that are

(a) Within 1.41 standard deviations of the mean. \_\_\_\_\_

(b) Between  $\mu - 3.5\sigma$  and  $\mu + 3\sigma$  \_\_\_\_\_

(c) Less than  $\mu - 3\sigma$  \_\_\_\_\_

**WARNINGS:**

\* This option —8— is not recognized in this subroutine  
 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 28  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
 — PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
 /welcomeAction.pl line 590  
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 — main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
 /welcomeAction.pl line 160

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 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 29  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
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 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 30  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
 — PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
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 — main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
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 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 41  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
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 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 42  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
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 /welcomeAction.pl line 590  
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 /welcomeAction.pl line 353  
 — main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
 /welcomeAction.pl line 160

\* This option —8— is not recognized in this subroutine  
 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 43  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
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 /welcomeAction.pl line 590  
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 /welcomeAction.pl line 353  
 — main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
 /welcomeAction.pl line 160

\* This option —8— is not recognized in this subroutine  
 HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
 /TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.

##More details:

— main::set\_default\_options called at (eval 134) line 447  
 — main::romberg called at (eval 137) line 64  
 — main::normal\_prob called at (eval 53) line 51  
 — main::\_ANON\_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
 — Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
 — PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
 /welcomeAction.pl line 590

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— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

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HASH(0x8c25370) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 137) line 64
— main::normal_prob called at (eval 53) line 52
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
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/welcomeAction.pl line 160

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7.(1 pt) Suppose the random variable  $x$  is best described by a normal distribution with  $\mu = 29$  and  $\sigma = 2.3$ . Find the  $z$ -score that corresponds to each of the following  $x$  values.

- (a)  $x = 29$   
 $z =$  \_\_\_\_\_
- (b)  $x = 20$   
 $z =$  \_\_\_\_\_
- (c)  $x = 24$   
 $z =$  \_\_\_\_\_
- (d)  $x = 34$   
 $z =$  \_\_\_\_\_
- (e)  $x = 38$   
 $z =$  \_\_\_\_\_
- (f)  $x = 31$   
 $z =$  \_\_\_\_\_

8.(1 pt) Suppose  $x$  is a normally distributed random variable with  $\mu = 9.6$  and  $\sigma = 2.4$ . Find each of the following probabilities:

- (a)  $P(8.3 \leq x \leq 15.6) =$  \_\_\_\_\_
- (b)  $P(9 \leq x \leq 14.2) =$  \_\_\_\_\_
- (c)  $P(6.7 \leq x \leq 14.6) =$  \_\_\_\_\_
- (d)  $P(x \geq 5.1) =$  \_\_\_\_\_
- (e)  $P(x \leq 16.7) =$  \_\_\_\_\_

**WARNINGS:**

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* This option —8— is not recognized in this subroutine
HASH(0x8c08a60) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 33
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
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```

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HASH(0x8c08a60) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 34
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
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— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
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— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

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HASH(0x8c08a60) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 35
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
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/welcomeAction.pl line 160

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```

* This option —8— is not recognized in this subroutine
HASH(0x8c08a60) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 36
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

```

```

* This option —8— is not recognized in this subroutine
HASH(0x8c08a60) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 37
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

```

9.(1 pt) The physical fitness of an athlete is often measured by how much oxygen the athlete takes in (which is recorded in milliliters per kilogram, ml/kg). The mean maximum oxygen uptake for elite athletes has been found to be 65 with a standard deviation of 5.8. Assume that the distribution is approximately normal.

- (a) What is the probability that an elite athlete has a maximum oxygen uptake of at least 65 ml/kg?  
 answer: \_\_\_\_\_
- (b) What is the probability that an elite athlete has a maximum oxygen uptake of 55 ml/kg or lower?  
 answer: \_\_\_\_\_
- (c) Consider someone with a maximum oxygen uptake of 31 ml/kg. Is it likely that this person is an elite athlete? Write "YES" or "NO."  
 answer: \_\_\_\_\_

**WARNINGS:**

```

* This option —8— is not recognized in this subroutine
HASH(0x8c0782c) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 32
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590

```

```
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353  
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c0782c) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 131) line 447  
— main::romberg called at (eval 134) line 64  
— main::normal_prob called at (eval 53) line 33  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 590  
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353  
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

10.(1 pt) The combined math and verbal scores for females taking the SAT-I test are normally distributed with a mean of 998 and a standard deviation of 202 (based on data from the College Board). If a college includes a minimum score of 825 among its requirements, what percentage of females do not satisfy that requirement?

### WARNINGS:

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c22ed8) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 134) line 447  
— main::romberg called at (eval 137) line 64  
— main::normal_prob called at (eval 53) line 23  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 590  
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353  
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

11.(1 pt) The extract of a plant native to Taiwan has been tested as a possible treatment for Leukemia. One of the chemical compounds produced from the plant was analyzed for a particular collagen. The collagen amount was found to be normally distributed with a mean of 77 and standard deviation of 5 grams per milliliter.

- (a) What is the probability that the amount of collagen is greater than 62 grams per milliliter?  
answer: \_\_\_\_\_
- (b) What is the probability that the amount of collagen is less than 79 grams per milliliter?  
answer: \_\_\_\_\_
- (c) What percentage of compounds formed from the extract of this plant fall within 3 standard deviations of the mean?  
answer: \_\_\_\_\_ %

### WARNINGS:

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c19298) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 134) line 447  
— main::romberg called at (eval 131) line 64  
— main::normal_prob called at (eval 53) line 33  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 590  
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353
```

```
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c19298) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 134) line 447  
— main::romberg called at (eval 131) line 64  
— main::normal_prob called at (eval 53) line 34  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 590  
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353  
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c19298) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 134) line 447  
— main::romberg called at (eval 131) line 64  
— main::normal_prob called at (eval 53) line 35  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714  
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 590  
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 353  
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-  
/welcomeAction.pl line 160
```

12.(1 pt) IQ scores are normally distributed with a mean of 100 and a standard deviation of 15. **Mensa** is an international society that has one - and only one - qualification for membership: a score in the top 2 on an IQ test.

(a) What IQ score should one have in order to be eligible for Mensa?

(b) In a typical region of 165,000 people, how many are eligible for Mensa?

13.(1 pt) Using diaries for many weeks, a study on the lifestyles of visually impaired students was conducted. The students kept track of many lifestyle variables including how many hours of sleep obtained on a typical day. Researchers found that visually impaired students averaged 8.78 hours of sleep, with a standard deviation of 1.03 hours. Assume that the number of hours of sleep for these visually impaired students is normally distributed.

(a) What is the probability that a visually impaired student gets less than 6.9 hours of sleep?  
answer: \_\_\_\_\_

(b) What is the probability that a visually impaired student gets between 6.1 and 8.38 hours of sleep?  
answer: \_\_\_\_\_

(c) Fourty percent of students get less than how many hours of sleep on a typical day?  
answer: \_\_\_\_\_ hours

### WARNINGS:

```
* This option —8— is not recognized in this subroutine  
HASH(0x8c1bfc4) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-  
/TDTD = gt; /td td nbsp; /td /tr /table at (eval128) line 3674.  
##More details:  
— main::set.defaultOptions called at (eval 134) line 447  
— main::romberg called at (eval 131) line 64  
— main::normal_prob called at (eval 53) line 45  
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223  
— Safe::reval called at /var/www/webwork/system/lib/PGtranslator.pm line 714
```

```

— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

```

---

```

* This option —8— is not recognized in this subroutine
HASH(0x8c1bfc4) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 134) line 447
— main::romberg called at (eval 131) line 64
— main::normal_prob called at (eval 53) line 46
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

```

14.(1 pt) Women's weights are normally distributed with a mean given by  $\mu = 143$  lb and a standard deviation given by  $\sigma = 29$  lb. Find the first decile,  $D_1$ , which separates the bottom 10% from the top 90%.

15.(1 pt) Healthy people have body temperatures that are normally distributed with a mean of  $98.20^\circ F$  and a standard deviation of  $0.62^\circ F$ .

(a) If a healthy person is randomly selected, what is the probability that he or she has a temperature above  $98.5^\circ F$ ?

answer: \_\_\_\_\_

(b) A hospital wants to select a minimum temperature for requiring further medical tests. What should that temperature be, if we want only 1.5 % of healthy people to exceed it?

answer: \_\_\_\_\_

**WARNINGS:**

```

* This option —8— is not recognized in this subroutine
HASH(0x8c1061c) TABLE border = "2" cellpadding = "3" BGCOLOR = "#FFFFFF" tr TD 8-
/TDTD = gt; /td td nbsp; /td /tr /table at (eval 128) line 3674.
##More details:
— main::set_default_options called at (eval 131) line 447
— main::romberg called at (eval 134) line 64
— main::normal_prob called at (eval 53) line 24
— main::_ANON_ called at /usr/lib/perl5/5.8.0/i386-linux-thread-multi/Safe.pm line 223
— Safe::reval called at /var/www/webwork/system/lib//PGtranslator.pm line 714
— PGtranslator::translate called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 590
— main::createTexSource called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 353
— main::downloadAllSets called at /var/www/cgi-bin/webwork/system/cgi-scripts-
/welcomeAction.pl line 160

```