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### Problems

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## F23-HW11: Problem 4

**(2 points)** [Library/UBC/ECON/ECON325/hw05/hw05\\_q09.pg](#) [Edit](#)**This set is visible to students.**

**Warning:** There may be something wrong with this question. Please inform your instructor including the warning messages below.

### WebWork Error

WebWork has encountered a software error while attempting to process this problem. It is likely that there is an error in the problem itself. If you are a student, report this error message to your professor to have it corrected. If you are a professor, please consult the error output below for more information.

### Error messages

```
ERRORS from evaluating PG file: Undefined address for Socket::pack_sockaddr_in at /usr/lib/x86_64-linux-gnu/perl-base/Socket.pm line 172 from within Socket::sockaddr_in called at line 27 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm from within Statistics::R::IO::Rserve::fh called at line 323 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm from within Statistics::R::IO::Rserve::_send_command called at line 234 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm from within Statistics::R::IO::Rserve::eval called at line 127 of [PG]/macros/core/RserveClient.pl from within main::rserve_start called at line 140 of [PG]/macros/core/RserveClient.pl from within main::rserve_eval called at line 46 of Library/UBC/ECON/ECON325/hw05/hw05_q09.pg
```

### Error details

ERROR caught by Translator while processing problem file: [Library/UBC/ECON/ECON325/hw05/hw05\\_q09.pg](#)

```
ERRORS from evaluating PG file:
Undefined address for Socket::pack_sockaddr_in at /usr/lib/x86_64-linux-gnu/perl-base/Socket.pm line 172
  from within Socket::sockaddr_in called at line 27 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm
  from within Statistics::R::IO::Rserve::fh called at line 323 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm
  from within Statistics::R::IO::Rserve::_send_command called at line 234 of /usr/local/share/perl/5.34.0/Statistics/R/IO/Rserve.pm
  from within Statistics::R::IO::Rserve::eval called at line 127 of [PG]/macros/core/RserveClient.pl
  from within main::rserve_start called at line 140 of [PG]/macros/core/RserveClient.pl
  from within main::rserve_eval called at line 46 of Library/UBC/ECON/ECON325/hw05/hw05_q09.pg
```

Input Read:

```
1: #####
2: ##KEYWORDS('Random variables';'linear combination'; 'find the mean of a
3: ##linear combination of two variables, find the standard deviation of a linear
4: ##combination of two variables given their covariance'.)
5: # DESCRIPTION
6: ## DBsubject(Probability)
7: ## DBchapter(Several variables)
8: ## DBsection(Covariance & correlation)
9: ## Date(2015/07/11)
10: ## Institution(University of British Columbia)
11: ## Author(Nelson Chen)
12: ## Level(2)
13: ## level('3')
14:
15: #####
16: DOCUMENT();
17: ## Initializations: (Required)
18: loadMacros(
19:   "PGstandard.pl",
20:   "PGchoicemacros.pl",
21:   "parserRadioButtons.pl",
22:   "MathObjects.pl",
23:   "parserMultiAnswer.pl",
24:   "RserveClient.pl",
25:   "answerHints.pl",
26:   "PGcourse.pl"
27: );
28:
29: #####
30: ## Setup: this is where we use Perl and PG objects (Required)
```



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36: my $shash = crypt($studentLogin, 'a1');
37: # warn("crypt: $shash");
38: @nums = (0..9,'a'..'z','A'..'Z');
39: my %nums = map { $nums[$_] => $_ } 0..$#nums;
40: my $seed = 0;
41: $seed = $seed * 62 + $nums[$_] foreach split(//, substr($shash, -5, 5));
42: ##warn("seed: " . $seed);
43:
44: #####Call R server
45: rserve_eval("set.seed($seed)"); ## can not combine with the rest
46:
47: @mx=rserve_eval('
48: mx <- sample(100:110, 1)
49: ');
50:
51: @my=rserve_eval('
52: my <- sample(115:125, 1)
53: ');
54:
55: @vx=rserve_eval('
56: vx <- sample(10:20, 1)
57: ');
58:
59: @vy=rserve_eval('
60: vy <- sample(20:30, 1)
61: ');
62:
63:
64: @c=rserve_eval('
65: c <- sample(2:12, 1)
66: ');
67:
68: @q1=rserve_eval('
69: q1=mx - my
70: round(q1 , 2)
71: ');
72:
73: @q2=rserve_eval('
74: q2=my - mx
75: round(q2 , 2)
76: ');
77:
78: @q3=rserve_eval('
79: q3=vx+vy-2*c
80: round(sqrt(q3), 2)
81: ');
82:
83: @v=rserve_eval('
84: tem=vx+vy-2*c
85: round(tem, 4)
86: ');
87:
88: @q4=rserve_eval('
89: round(sqrt(q3), 2)
90: ');
91:
92: $q1ans =$q1[0];
93: $q2ans =$q2[0];
94: $q3ans =$q3[0];
95: $q4ans =$q4[0];
96:
97: #####
98: ## Main Text: where all text goes (Required)
99: Context()->texStrings;
100: BEGIN_TEXT
101: Consider the random variables  $X$  and  $Y$  with
102: $BR
103: $BCENTER
104: \(\
105: E(X) =$mx[0]
106: \)
107: $ECENTER
108: $BR
109: $BCENTER
110: \(\
111: E(Y) =$my[0]
112: \)
113: $ECENTER
114: $BR
115: $BCENTER
116: \(\
117: Var(X) =$vx[0]
118: \)
119: $ECENTER
120: $BR
121: $BCENTER
122: \(\
123: Var(Y) =$vy[0]

```



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129: Cov(X, Y)=Sc[0]
130: \)
131: $ECENTER
132: $BR
133: Define the random variables
134: $BR
135: $BR
136: $BCENTER
137: \)
138: W_1=X-Y
139: \)
140: $ECENTER
141: $BR
142: $BCENTER
143: \)
144: W_2=Y-X
145: \)
146: $ECENTER
147: $BR
148: $BR
149: Answer the following, rounding your answers to two decimal places.
150: $BR
151: $BR
152: $BBOLD(a) $EBOLD What is the mean of \((W_1)\) ? \{ ans_rule(7) \}
153: $BR
154: $BR
155: $BBOLD(b) $EBOLD What is the mean of \((W_2)\) ? \{ ans_rule(7) \}
156: $BR
157: $BR
158: $BBOLD(c) $EBOLD Find the standard deviation of \((W_1)\). \{ ans_rule(7) \}
159: $BR
160: $BR
161: $BBOLD(d) $EBOLD Find the standard deviation of \((W_2)\). \{ ans_rule(7) \}
162: END_TEXT
163: #####
164: ## Answers evaluation (Required)
165: ANS( num_cmp($q1ans, tol=> 0.01) );
166: ANS( num_cmp($q2ans, tol=> 0.01) );
167: ANS( num_cmp($q3ans, tol=> 0.01) );
168: ANS( num_cmp($q4ans, tol=> 0.01) );
169:
170: #####
171: ## Solution (Optional but recommended)
172: Context()->texStrings;
173: BEGIN_SOLUTION
174:
175: $BBOLD (a) $EBOLD The mean of \(( W_1 \)) is
176: $BR
177: $BR
178: $BCENTER
179: \)
180: E(W_1) = E(X) - E(Y) = $mx[0] - $my[0] = $q1ans.
181: \)
182: $ECENTER
183: $BR
184: $BR
185:
186: $BBOLD (b) $EBOLD The mean of \(( W_2 \)) is
187: $BR
188: $BR
189: $BCENTER
190: \)
191: E(W_2) = E(Y) - E(X) = $my[0] - $mx[0] = $q2ans.
192: \)
193: $ECENTER
194: $BR
195: $BR
196:
197:
198:
199: $BBOLD (c) $EBOLD For any random variables \((X)\) and \((Y)\) and constants \((a, b, c)\)
200: $BR
201: $BR
202: $BCENTER
203: \)
204: Var(aX+bY+c) = a^2 Var(X) + b^2 E(Y) +2ab Cov(X, Y).
205: \)
206: $ECENTER
207: $BR
208: In this case, \(( a= 1, b=-1)\) and so
209: $BR
210: $BR
211: $BCENTER
212: \)
213: Var(X-Y) = $vx[0] + $vy[0] - 2 \times $c[0] = $v[0].
214: \)
215: $ECENTER
216: $BR

```



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```

221: $BODY ( ) $BODY FOR ANY RANDOM VARIABLES (X,Y) AND CONSTANTS (a, b, c)
222: $BR
223: $BR
224: $CENTER
225: \ (
226: Var(aX+bY+c) = a^2 Var(X) + b^2 E(Y) +2ab Cov(X, Y).
227: \ )
228: $CENTER
229: $BR
230: In this case, \ ( a= -1, b=1\ ) and so
231: $BR
232: $BR
233: $CENTER
234: \ (
235: Var(Y-X) = $vx[0] + $vy[0] - 2\times $c[0] = $v[0].
236: \ )
237: $CENTER
238: $BR
239: The standard deviation is the square root of the above value.
240: END_SOLUTION
241: ENDDOCUMENT();

```

### Request information

Time	Tue Oct 08 15:39:48 2024	
Method	GET	
URI	/webwork2/Fall2024-Stat321-1/F23-HW11/4	
HTTP Headers	X-Real-IP	10.42.7.0
	Sec-Fetch-Mode	navigate
	Referer	https://math.knox.edu/webwork2/Fall2024-Stat321-1/F23-HW11/5?effectiveUser=aleahy&showOldAnswers=1&displayMode=Ma
	Sec-Ch-Ua-Mobile	?0
	Upgrade-Insecure-Requests	1
	Sec-Ch-Ua-Platform	"Linux"
	Sec-Fetch-Site	same-origin
	Accept	text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchar
	X-Forwarded-Proto	https
	User-Agent	Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/129.0.0.0 Safari/537.36
	Sec-Fetch-User	?1
	X-Forwarded-Host	math.knox.edu
	Sec-Fetch-Dest	document
	Accept-Encoding	gzip, deflate, br, zstd
	X-Forwarded-For	10.42.7.0
	X-Forwarded-Port	443
	Accept-Language	en-US,en;q=0.9
	Priority	u=0, i
	Cookie	WeBWorKCourseAuthen.Fall2024-Math250-IS=aleahy%09tuYcngvB7uClvniPmOYGsGGbDvwXWBuv%091728335722; WeBWorKCC1=aleahy%09Ye2fIEEK6eInt6UFvxYKvNkfuOocqxtM%091728401986; _fbp=fb.1.1701874674790.509473557; _hjSessionUser_3359'



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Host	math.knox.edu
X-Forwarded-Server	traefik-5b8d564b75-t54bb
Sec-Ch-Ua	"Google Chrome";v="129", "Not=A?Brand";v="8", "Chromium";v="129"

Show:  Correct Answers  Problem Grader

Preview My Answers

Check Answers

Submit Answers

Show Me Another

You have attempted this problem 0 times.

You have unlimited attempts remaining.

Show Past Answers

Email Instructor

## PG question failed to render

Unable to obtain error messages from within the PG question.

## WeBWork Warnings

WeBWork has encountered warnings while processing your request. If this occurred when viewing a problem, it was likely caused by an error or ambiguity in that problem. Otherwise, it may indicate a problem with the WeBWork system itself. If you are a student, report these warnings to your professor to have them corrected. If you are a professor, please consult the warning output below for more information.

## Warning messages

- Processing of this PG problem was not completed. Probably because of a syntax error. The translator died prematurely and no PG warning messages were transmitted. at `/opt/webwork/webwork2/lib/WeBWork/ContentGenerator/Problem.pm` line 667.

## Request information

Time	Tue Oct 08 15:39:48 2024
Method	GET
URI	/webwork2/Fall2024-Stat321-1/F23-HW11/4

This set is visible to students.