1-5. A single draw will be made with equal probability from the four possibilities {0, 0, 0, 8}. Let X denote the number selected.

1. $P(X^2 < 25) =$

a) 1/4 b) 3/4 c) 2/4 d) 1 e) 7/16

ITEM	1	TEST	7600	
	1	2*	3	4	5
U	14	86	0	0	0
L	14	86	0	0	0

MEAN SCORE 15.34 STANDARD DEVIATION 3.88

Exam 5 GRADE = 2.0 + 0.3 (SCORE − 11)

2. $E\,X =$

a) 1 b) 5 c) 2 d) 4 e) 3

ITEM	2	TEST	7600	
	1	2	3*	4	5
U	0	4	93	4	0
L	7	0	71	21	0

3. $E\,X^2 =$

a) 8 b) 16 c) 64 d) 4 e) 12

ITEM	3	TEST	7600	
	1	2*	3	4	5
U	0	96	4	0	0
L	4	46	21	25	4

4. Variance X =

a) 8 b) 16 c) 64 d) 4 e) 12

ITEM	4	TEST	7600	
	1	2	3	4	5*
U	0	0	0	0	100
L	39	4	7	18	32

5. SD X = (chose ***closest*** answer)

a) 1.5 b) 2.5 c) 3.5 d) 4.5 e) 5.5

ITEM	5	TEST	7600	
	1	2	3*	4	5
U	0	0	100	0	0
L	14	18	50	18	0

6-9. Random variables X, Y satisfy

E X = 3 Var X = 2

E Y = 7 Var Y = 4

6. E (2X - Y + X - 4) =

a) -1 b) 2 c) -2 d) 5 e) 0

```
 ITEM   6   TEST 7600
   1   2   3*  4   5
U  0   4  96   0   0
L  7   4  86   0   4
```

7. Variance (2X - 4) =

a) 0 b) 8 c) 4 d) 2 e) 10

```
 ITEM   7   TEST 7600
   1   2*  3   4   5
U  7  82  11   0   0
L 75   0  18   7   0
```

8. If X, Y are ***statistically independent*** Variance (X + Y) =

a) 2 b) $\sqrt{20}$ c) $\sqrt{2}$ d) 4 e) 6

```
 ITEM   8   TEST 7600
   1   2   3   4   5*
U  0   0   0   0 100
L  0   0   0   0 100
```

9. If X, Y are ***statistically independen***t Variance (X - Y) =

a) 2 b) $\sqrt{20}$ c) $\sqrt{2}$ d) 4 e) 6

```
 ITEM   9   TEST 7600
   1   2   3   4   5*
U 21   4   0   0  75
L 57   0  18   0  25
```

10-12. One play of a venture returns random amount X with

E X = 3 Variance X = 4 SD X = 2

There will be 100 independent plays of this venture whose total T we will denote (as usual) by $T = X_1 + ... + X_{100}$.

10. E T =

a) 20 b) 30 c) 900 d) 200 e) 300

ITEM	10		TEST 7600		
	1	2	3	4	5*
U	0	0	4	0	96
L	0	4	4	4	89

11. SD T =

a) 20 b) 30 c) 900 d) 200 e) 300

ITEM	11		TEST 7600		
	1*	2	3	4	5
U	50	4	0	46	0
L	7	21	4	68	0

12. Using the normal approximation of the distribution of T and the rules of thumb to determine the approximate value of P(T < 320).

a) 0.975 b) 0.84 c) 0.68 d) 0.5 a) 0.34

ITEM	12		TEST 7600		
	1	2*	3	4	5
U	11	43	14	21	11
L	46	11	29	7	7

13-15. We are given

P(OIL) = .4 **P(+ | if OIL) = 0.75** **P(+ | if OIL^C) = 0.2**

cost to test = 10 **cost to drill = 50** **gross return from oil = 500**

13. P(**OIL +**) =

a) 0.75 b) 0.3 c) .25 d) .5 e) .8

```
 ITEM  13   TEST 7600
   1   2*  3   4   5
U 11  89   0   0   0
L 54  25   7   7   7
```

14. Net return from the policy "test but only drill if the test is +" in the contingency "**OIL +**" =

a) 500 b) 450 c) -60 d) 440 e) -10

```
 ITEM  14   TEST 7600
   1   2   3   4*  5
U  0   0   4  93   4
L 11  14   0  75   0
```

15. E(net return from policy #14) is a sum. What is the contribution of the contingency **OIL +** to that sum?

a) 145 b) 375 c) 132 d) -45 e) -3

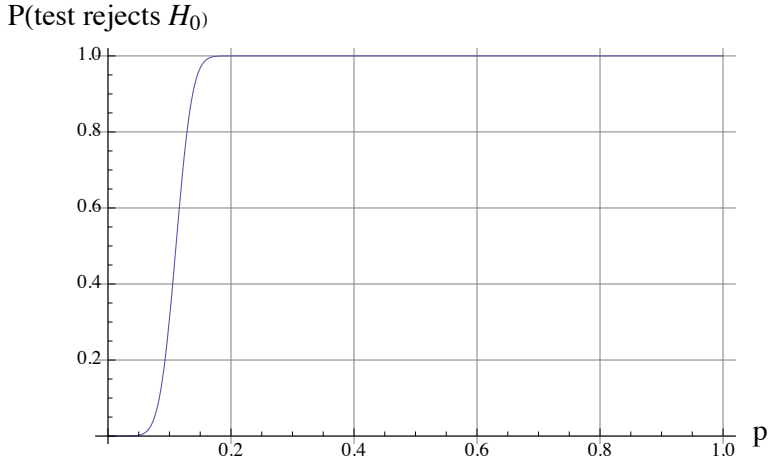
```
 ITEM  15   TEST 7600
   1   2   3*  4   5
U  0   7  93   0   0
L 18  46  32   4   0
```

16. A p-value of 0.013 has been calculated from data. A significance value α = 0.01 has been decided upon for this test. What decision is made by the test?

a) reject $\mathbf{H_0}$ b) fail to reject $\mathbf{H_0}$ c) not enough information to decide

```
 ITEM  16   TEST 7600
   1   2*  3   4   5
U 14  75  11   0   0
L 54  32  14   0   0
```

17-19. Here is P(reject H_0) curve for a test of H_0: p = 0.1.



17. Choose (the closest value to) α.

a) .19 b) .59 c) .49 d) .09 e) .29

```
 ITEM  17   TEST 7600
   1   2   3   4   5*
U 21   7   0   4  68
L 29   0  11  25  36
```

18. Which is the alternative hypothesis $\mathbf{H_A}$?

a) $p < 0.9$ b) $p = 0.1$ c) $p \neq 0.1$ d) $p > 0.1$ e) $p > 0.9$

```
 ITEM  18   TEST 7600
   1   2   3   4*  5
U  0   0   4  96   0
L 11   0  11  68  11
```

19. P(reject the null hypothesis when p = 0.15) ~

a) 0.87 b) 0.77 c) 0.33 d) 0.23 e) 0.13

```
 ITEM  19   TEST 7600
   1*  2   3   4   5
U 86   7   0   0   7
L 32  18  14  11  25
```

20-23. A business wishes to test the null hypothesis that the rate p at which customers use PayPal is $p_0 = 0.3$ versus the alternative that the rate p exceeds 0.3. An equal probability random sample of 100 transactions is selected from the many thousands for the last month and it is found that 41 are PayPal. The test will use $\alpha = 0.05$.

20. The numerical value of SD(p_0) (text calls it SD($\hat{p}$)) =

a) 0.057 b) 0.046 c) 0.061 d) 0.037 e) 0.042

```
 ITEM  20   TEST 7600
   1   2*  3   4   5
U  0 100   0   0   0
L 21  54  11   7   7
```

21. What is the numerical value of the test statistic z for this z-test?

a) 1.40 b) 2.40 c) 2.54 d) 2.64 e) 2.87

```
 ITEM  21   TEST 7600
   1   2*  3   4   5
U  0  96   0   0   4
L  7  29  32  25   7
```

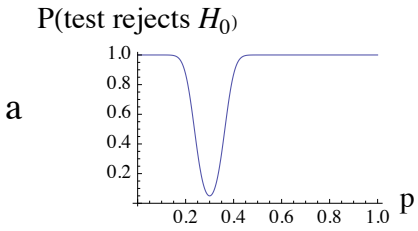
22. If the answer to #21 is taken to be 3.22 (it is NOT) what would be the p-value?

a) 0.8944 b) 0.0006 c) 0.962 d) 0.1004 e) 0.0406

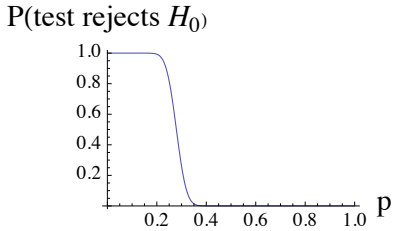
```
 ITEM  22   TEST 7600
   1   2*  3   4   5
U  0  96   4   0   0
L 29  25  29  11   7
```

23. Which one is the P(reject null hypothesis) curve for this test?

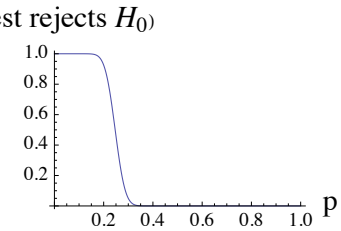
a



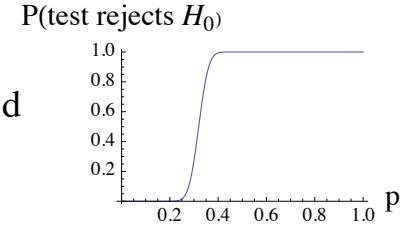
b



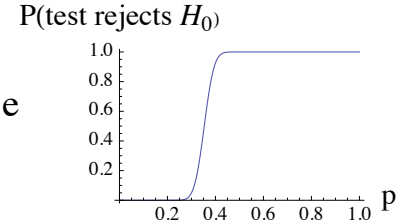
c



d



e




```
 ITEM  23   TEST 7600
   1   2   3   4   5*
U  7   0  11  18  64
L 29  11  18  14  25
```