**1.**

Let a = 2i + 3j and b = -9i + 6j. Find c = a – b.

A) c = -3j  
B) c = 9i  
C) c = 11i + 9j  
D) c = 11i – 3j

**2.**

Let a = 2i + 3j and b = -9i + 6j. Find d = a • b.

A) 36  
B) -36  
C) 0  
D) -18i2 + 18j2

**3.**

Find the intersection of L1: x – 2 = ½(y + 1) = 1/3(z – 3), L2: 1/3(x – 5) = ½(y – 1) = z – 4, if they intersect.

A) (-1, 2, -3)  
B) (0, 0, 3)  
C) (2, -1, 3)  
D) They do not intersect

**4.**

What can we say about the plane with n = (7, 11, 0)?

A) It’s perpendicular to the x-y plane  
B) It’s the x-y plane  
C) It’s parallel to the x-y plane, but offset by mathml equationunits along the z-axis  
D) It’s parallel to the x-y plane, but offset by mathml equationunits along the z-axis

**5.**

What can we say about L: x = 7 – 4t, y = 3 + 6t, z = 9 + 5t and *P*: 4x + y + 2z = 17?

A) They are orthogonal  
B) L is co-planer with *P*  
C) L and *P* are parallel  
D) L intersects *P* at a mathml equationangle relative to the z-axis

**6.**

Convert the following into spherical coordinates: x2 + y2 + z2 = 36

A)  https://angel.grantham.edu/AngelUploads/QuestionData/2aad037f-5677-4608-adbe-63f87b341d92/test3_Q12_A.jpg#%7B9FBC5B32-439B-45A4-92BB-3DDB54B78B85%7D radians  
B) (6, 0.6, mathml equation)  
C) mathml equation = 6  
D) None of the above

**7.**

What is the angle between these two planes: x + 2y – z = 13 & -2x – 4y + 2z = -13?

A) mathml equation  
B) mathml equation  
C) mathml equation  
D) mathml equation

**8.**

https://angel.grantham.edu/AngelUploads/QuestionData/1f733f9b-4c57-414b-b2b3-7c705d463050/MA312.03.15.jpg#%7B35390437-401E-48D4-BC47-352AF339B609%7D

A) mathml equation  
B) mathml equation  
C) mathml equation  
D) There is no way to know without knowing f(x,y) first

**9.**

https://angel.grantham.edu/AngelUploads/QuestionData/620c31c9-af57-48df-8ac0-bc72b4afb47c/test3_Q16.jpg#%7BE58C2502-F727-4C3C-B355-AF7CD75AAD9E%7D

A) r  
B) mathml equation  
C) mathml equation  
D) mathml equation

**10.**

https://angel.grantham.edu/AngelUploads/QuestionData/a0a78094-6fe6-4923-969e-632694d2e77a/test3_Q17.jpg#%7BB23B76B5-B5B4-4D5D-A306-64F45064FCD8%7D

A) 384 t 7  
B) 8 t 8  
C) 1024 t 7  
D) 64 t 5

**11.**

https://angel.grantham.edu/AngelUploads/QuestionData/1bc5fc12-aed9-43ac-9208-2b2bde611180/test3_Q18.jpg#%7BDE96C690-1236-403F-AF49-EE98EB871D9D%7D

A) (x + z) exp(yz + xz + xy)  
B) (x + z) exp(-yz - xz - xy)  
C) (x + z) exp[y(x + z)]  
D) exp(yz + xz + xy)

**12.**

https://angel.grantham.edu/AngelUploads/QuestionData/48078908-3dbd-4dee-bac5-92d1472afcdc/test3_Q19.jpg#%7B4856D82D-5832-436F-9AFF-78DDDF56B2F2%7D

A) 0  
B) Cannot be differentiated  
C) 108w2  
D) None of the above

**13.**

There are two extrema for z = 2x – x2 + 2y2 – y4. One is located at (1, 1, 2). Where is the second one located?

A) (-1, 1, 2)  
B) (1, -1, 2)  
C) (1, 2, -1)  
D) There is no second extreme point

**14.**

https://angel.grantham.edu/AngelUploads/QuestionData/cca09c09-874e-48d2-85f2-19e1508b41ce/test3_Q21.jpg#%7BA55B84B3-E4BD-4D0F-BF10-4C45B0EF1B1E%7D

A) Q defines a minimum  
B) Q defines a maximum  
C) Q defines a minimum or a maximum  
D) None of the above

**15.**

mathml equationdenotes:

A) The full derivative of f  
B) *For all* f  
C) A partial derivative of f with respect to some variable  
D) The gradient vector of f

**16.**

mathml equation

A) mathml equation  
B) mathml equation  
C) https://angel.grantham.edu/AngelUploads/QuestionData/eac0833c-33c5-40db-89c4-94e158c67f47/test3_Q23_c.jpg#%7BFD6446C6-D3B1-46F3-978F-72F57AA115A4%7D  
D) mathml equation