Math 32B Lecture 2, Winter 2020	Homework 7	Due February 21, in class
Name:	**Section:**	**UID:**

- Exercises are taken from J. Rogawski, C. Adams, R. Franzosa *Calculus, Multivariable*, 4th Ed., W. H. Freeman & Company.

17.3 Conservative Vector Fields

Exercises outside the textbook

In Exercises 1–6, find a potential function for **F** *or determine that* **F** *is not conservative.*

1. $\mathbf{F} = \langle x, y, z \rangle$.

2. $\mathbf{F} = \langle y, z, x \rangle$.

3. $\mathbf{F} = \langle y^4 + e^z, 4xy^3, xe^z \rangle$

4. $\mathbf{F} = \langle (3z+1)e^x, \cos y, 3e^x \rangle$.

Math 32B Lecture 2, Winter 2020	Homework 7	Due February 21, in class
Name:	**Section:**	**UID:**

5. $\mathbf{F} = \langle xy^{-1}, y, 1\rangle$.

6. $\mathbf{F} = \langle 2xy + 7, x^2 - 3z, -3y\rangle$.

17.4 Parametrized Surfaces and Surface Integrals

Exercises outside the textbook

1. Show that

$$G(r, \theta) = (r\cos\theta, r\sin\theta, 4 - r^2)$$

parametrizes the parabola $z = 4 - x^2 - y^2$. Describe the grid curves of this parametrization.

Math 32B Lecture 2, Winter 2020	Homework 7	Due February 21, in class
Name:	**Section:**	**UID:**

2. Let

$$G(u,v) = (u+3, 2u-v, u+v).$$

Do the following:

(a) Show that G parametrizes the plane $3x - y - z = 9$.

(b) Calculate $\mathbf{T}_u$, $\mathbf{T}_v$, and $\mathbf{N}(u,v)$.

3. Let

$$G(x,y) = (x, y, x^2 - y^2).$$

Calculate $\mathbf{T}_x$, $\mathbf{T}_y$, and $\mathbf{N}(x,y)$.

Math 32B Lecture 2, Winter 2020	Homework 7	Due February 21, in class
Name:	**Section:**	**UID:**

In Exercies 4–7, calculate $\mathbf{T}_u$, $\mathbf{T}_v$, *and* $\mathbf{N}(u,v)$ *for the parametrized surface at the given point. Then find the equation of the tangent plane to the surface at that point.*

4. $G(u,v) = (u - 2v, 2u + v, 3u); \qquad (u,v) = (1,4).$

5. $G(u,v) = (u^2 - v^2, u - v, u + v); \qquad (u,v) = (3,2).$

Math 32B Lecture 2, Winter 2020	Homework 7	Due February 21, in class
Name:	**Section:**	**UID:**

6. $G(\theta, \varphi) = (\cos\theta\cos\varphi, \sin\theta\cos\varphi, \sin\varphi)$; $(\theta, \varphi) = (\frac{\pi}{2}, \frac{\pi}{4})$.

7. $G(r, \theta) = (1 - r^2, r\cos\theta, r\sin\theta)$; $(r, \theta) = (\frac{1}{2}, \frac{\pi}{4})$.