

# MAKE IT WORK.

*MATHEMATICS EDITION*

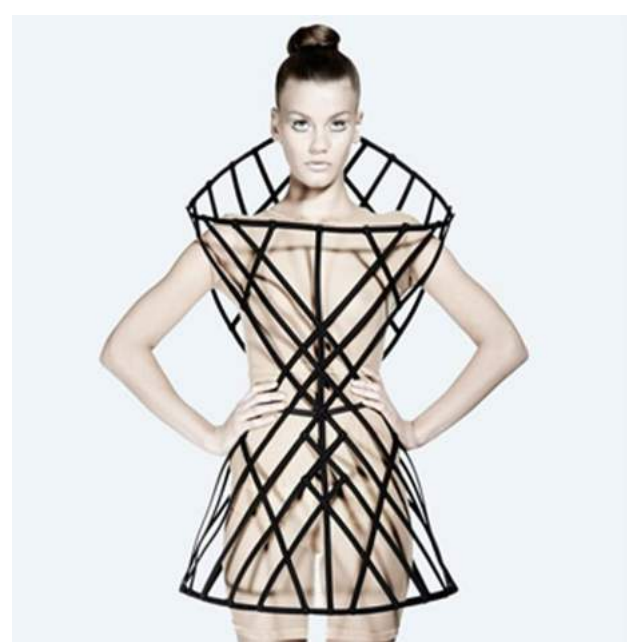
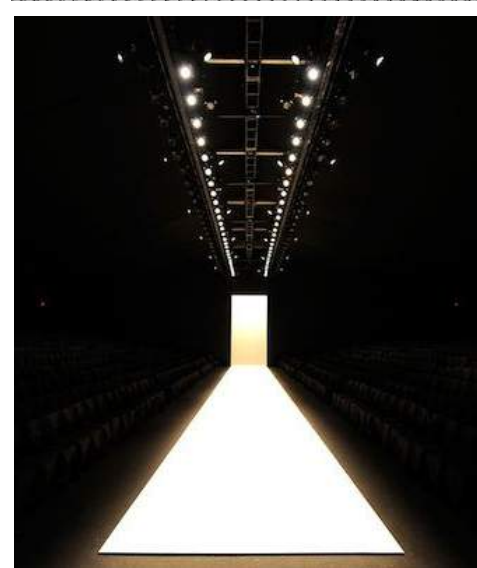
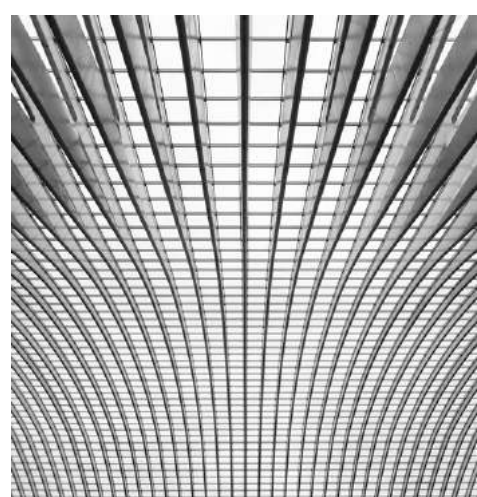
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ENGAGE  
*DATUM*

EMPOWER  
*EXPANSION*



AVANT-GARDE  
*TENSION*

# CLASSROOM 101







$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\sqrt{1-x+2h} - \sqrt{1-x}}{h} \\ &= \lim_{h \rightarrow 0} \frac{\sqrt{1-x+2h} - \sqrt{1-x}}{h} \cdot \frac{\sqrt{1-x+2h} + \sqrt{1-x}}{\sqrt{1-x+2h} + \sqrt{1-x}} \\ &= \lim_{h \rightarrow 0} \frac{1-x+2h - (1-x)}{h(\sqrt{1-x+2h} + \sqrt{1-x})} = \lim_{h \rightarrow 0} \frac{2h}{h(\sqrt{1-x+2h} + \sqrt{1-x})} \\ &= \lim_{h \rightarrow 0} \frac{2}{\sqrt{1-x+2h} + \sqrt{1-x}} = \frac{2}{2\sqrt{1-x}} = \frac{1}{\sqrt{1-x}} \end{aligned}$$

Derivation of the derivative of the function  $f(x) = \sqrt{1-x}$

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\sqrt{1-x+2h} - \sqrt{1-x}}{h} \\ &= \lim_{h \rightarrow 0} \frac{1-x+2h - (1-x)}{h(\sqrt{1-x+2h} + \sqrt{1-x})} = \lim_{h \rightarrow 0} \frac{2h}{h(\sqrt{1-x+2h} + \sqrt{1-x})} \\ &= \lim_{h \rightarrow 0} \frac{2}{\sqrt{1-x+2h} + \sqrt{1-x}} = \frac{2}{2\sqrt{1-x}} = \frac{1}{\sqrt{1-x}} \end{aligned}$$



$$\begin{aligned} f(x) &= \frac{1}{x^2} = x^{-2} \Rightarrow f'(x) = -2x^{-3} = -\frac{2}{x^3} \\ &= -\frac{2}{x^3} = -\frac{2}{x^2 \cdot x} = -\frac{2}{x^2} \cdot \frac{1}{x} \\ &= -\frac{2}{x^2} \cdot x^{-1} = -2x^{-2-1} = -2x^{-3} = -\frac{2}{x^3} \end{aligned}$$





**1-18** Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

1.  $y = 2 - \frac{1}{2}x$ ,  $y = 0$ ,  $x = 1$ ,  $x = 2$ ; about the  $x$ -axis
3.  $x = 2\sqrt{y}$ ,  $x = 0$ ,  $y = 9$ ; about the  $y$ -axis
6.  $y = x^3$ ,  $y = x$ ,  $x \geq 0$ ; about the  $x$ -axis
7.  $y^2 = x$ ,  $x = 2y$ ; about the  $y$ -axis
9.  $y = x$ ,  $y = \sqrt{x}$ ; about  $y = 1$
13.  $y = 1/x$ ,  $x = 1$ ,  $x = 2$ ,  $y = 0$ ; about the  $x$ -axis
17.  $y = x^3$ ,  $y = \sqrt{x}$ ; about  $x = 1$

$$\int_0^1 (2 - \frac{1}{2}x) dx = \left[ 2x - \frac{1}{4}x^2 \right]_0^1 = 2 - \frac{1}{4} = \frac{7}{4}$$

$$\int_0^1 x^3 dx = \left[ \frac{1}{4}x^4 \right]_0^1 = \frac{1}{4}$$

$$\int_0^1 x^3 dx = \left[ \frac{1}{4}x^4 \right]_0^1 = \frac{1}{4}$$

$$\int_0^1 x \cos x dx = \left[ x \sin x + \cos x \right]_0^1 = \sin 1 + \cos 1 - 1$$

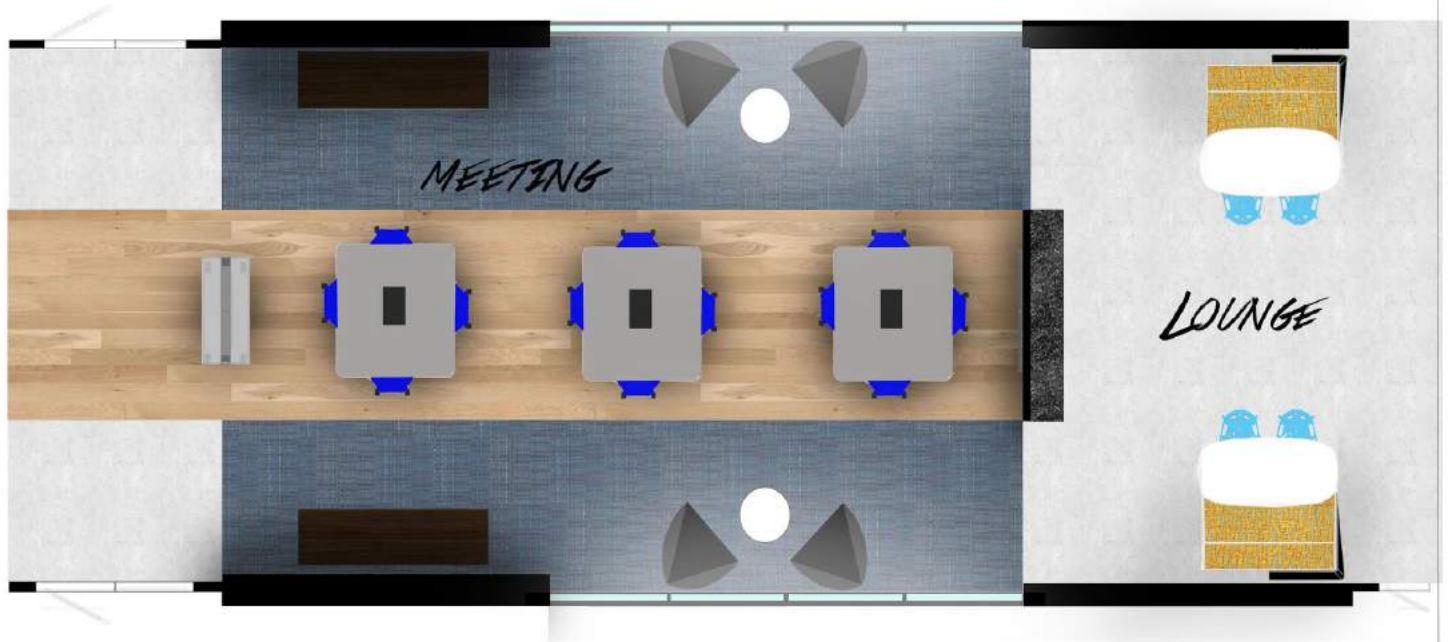
$$\int_1^2 \sin x dx = \left[ -\cos x \right]_1^2 = -\cos 2 + \cos 1$$

1-18 Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

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# CONFERENCE ROOM











THANK YOU

Additional  
Deliverables.



“

Inspired by the avant-garde visions of runway designers, Make it Work provides spaces where the UF Department of Math can implement new teaching styles and engage in creative collision. Much like the bold designers of the fashion industry, flipped classrooms are pushing the limits and empowering students to step outside of their comfort zone. While the current classroom structure only supports traditional lectures, Make it Work creates a collaborative environment where students learn and grow from each other. Looking again to the world of fashion, innovations are often revealed on striking runways where observers can find inspiration. A hub for the presentation and exchange of new thoughts and ideas is essential to the development of the Mathematics Department. Tension in the material palette, emphasis on linear forms, and spatial conditions that evoke expansion, all work together to empower and engage the avant-garde minds of students today.

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# RESEARCH

Flexibility of work spaces creates more variety of choice for the users. Using moveable furniture and providing the ability to sub-divide the space allows the user to manipulate the space to his needs.

Within a flipped classroom setting, the ability to adapt between a class modality to a group modality allows the teacher to address the class as a whole and allows the class to break off into groups for group work and sub-divided teaching units.

Hassanain, 2006.

## APPLICATION

Both spaces incorporate moveable furniture that can be attached or detached according to the users needs. It allows the ability for conference seating, lecture style seating, and group work seating.

# RESEARCH

With many classrooms starting to incorporate technology into their lessons, informational technology is becoming more common within design of learning spaces. Teacher and students prefer classrooms in which the user can move around and view individual screens and to projected larger screens.

Zandvliet; Straker. 2001

## APPLICATION

Both spaces provide a range of technology in order for teachers to demonstrate or project to the whole classroom as well as for students to present and work in groups. In addition to technology, both spaces provide adequate room for computer and non-computer materials to tailor to the individual student.

# BIBLIOGRAPHY

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