Name: Erik Sundblad **Worksheet 7**

Exercise 1. Determine the equation of the plane through points $P(2,-1,3)$, $Q(1,4,0)$, and $R(0,-1,5)$. Then determine where it intersects the coordinate axes and find the intersection with the xy-plane.

Exercise 2. Sketch the cylinder $x^2 + 4y^2 = 16$.

xy plane intersection

$5y + 4z + 0 = 21$

$y = -\frac{4}{5}x + \frac{21}{5}$ equation describing the line

$\vec{QR} = \langle -1, 5, 5 \rangle$

$\vec{PQ} = \langle -1, 5, -3 \rangle$

$\vec{PR} = \langle -2, 0, 2 \rangle$

$P_0P = \langle (x-2), (y+1), (z-3) \rangle$

$\vec{PQ} \times \vec{PR} = \begin{vmatrix} -1 & -2 \\ 5 & 0 \\ -3 & 2 \end{vmatrix} = \langle 10-0, 6-{}^{-2}, 0-{}^{-10} \rangle$

$\langle 10, 8, 10 \rangle = \vec{n}$ at P

Eq

$10(x-2) + 8(y+1) + 10(z-3) = 0$

where does

$x=0$

$y=0$

$z=0$

Cross $y = x, z=0$

x intcept $= z, y=0$

z int $= x, y=0$

y intcept

$10(0-2) + 8(y+1) + 10(0-3) = 0$

$-20 + 8y + 8 - 30 = 0$

$8y = 42$ $(0, 5.25, 0)$

$y = 5.25$

x int

$10(x-2) + 8(0+1) + 10(0-3) = 0$

$10x - 20 + 8 - 30 = 0$

$10x = 42$ $(4.2, 0, 0)$

$10(0-2) + 8(0+1) + 10(z-3) = 0$

$-20 + 8 + 10z - 30 = 0$

$z = 4.2$

$(0, 0, 4.2)$