

This is an exercise sheet for you to use if you feel you will benefit from it. It is not required, nor will you be turning it in. However, it is expected that you be able to answer these questions on an exam without aid, so you are responsible for knowing these things (unless otherwise indicated below).

Units. Complete the tables below. Feel free to look up these up for this exercise.

	Common Imperial units	Common SI units
Mass		
Force		
Torque (torsion)		
Moments (hint, not time)		
Stress (or pressure)		
Length		
Time		
Temperature		

	Measure of?
lb-in = in-lb	<i>Bending moment and torque</i>
Nm = N-m	
lb/in ² = psi	
kpsi=ksi	
N/m ² = Pa	
N/mm ²	
kg	
N	
lb _m (pound mass)	
slug	
lb _f (pound force)	

		Conversion factor	Required to memorize?
psi	Kpsi=ksi	<i>1 ksi = 1000 psi</i>	<i>yes</i>
psi	Mpsi=Msi	1 Mpsi = psi	<i>yes</i>
Pa	MPa	1 MPa = Pa	<i>yes</i>
Pa	GPa	1 GPa = Pa	<i>yes</i>
N/m ²	Pa	1 N/m ² = Pa	<i>yes</i>
N/mm ²	Pa	1 N/mm ² = Pa	<i>yes</i>
kN/mm ²	Pa	1 kN/mm ² = Pa	<i>yes</i>
kN	N	1 N = kN	<i>yes</i>
MN	N	1 N = MN	<i>yes</i>
pound*	N	1 N = lb	<i>no</i>
pound mass	slug	1 lb _m = slug	<i>no</i>
1 N	1 lb	1 lb = N	<i>no</i>
1 kpsi	1 MPa	1 ksi = MPa	<i>no</i>

*note, it is generally understood that “pound” is a force unless otherwise indicated.

Arithmetic. You should become comfortable doing the following level of math without a calculator. If you need more practice, feel free to make up more problems of similar complexity.

$1/8 =$	(3 sig figs)	$3/4 =$	$20/4 =$
$1/4 =$		$7/8 =$	$40/8000 =$
$3/8 =$		$100/4 =$	$40000/80 =$
$1/3 =$		$1/4000 =$	$120/0.3 =$
$1/2 =$		$5/4 =$	$1.2/0.0003 =$
$5/8 =$		$8/3 =$	$13/3 =$
$2/3 =$		$9/4 =$	$13/0.03 =$

$$8000/30 = 800/3 = (8/3)*100 = (2 \text{ and } 2/3)*100 = (2.67)*100 =$$

$$40\text{lb} / [(3\text{in})(5\text{in})] =$$

$$15\text{lb}/12\text{in}^2 = (3*5)\text{lb} / (3*4)\text{in}^2 = (5/4)\text{psi} = 1 \frac{1}{4} \text{psi} =$$

$$(40,000\text{in-lb})(2\text{in})/16\text{in}^4 = 8*10,000 \text{ in}^2\text{lb} / 16\text{in}^4 =$$

$$(3000\text{psi}/5000\text{psi})(80\text{in}) = (3/5)*80\text{in} = (6/10)*80\text{in} =$$

$$(16\text{in}^4/2\text{in})*3000\text{lb}/\text{in}^2 =$$

$$(16\text{in}^4/40,000\text{in-lb})*3000\text{lb}/\text{in}^2 =$$

Should know the following trig values:

$\sin(\theta)$ and $\cos(\theta)$ for $\theta = 0\text{deg}, 30\text{deg}, 45\text{deg}, 60\text{deg}, 90\text{deg}$

know the equivalent radians for: $0\text{deg}, 30\text{deg}, 45\text{deg}, 60\text{deg}, 90\text{deg}$ (ex $\pi/4$ rad = 45 deg)