

Grade 12 Advanced Functions (University Preparation)
Unit 0 – Quest 1 – Review Material, Mechanical Questions

Mr. N. Nolfi

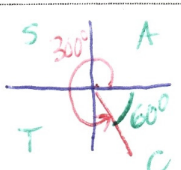
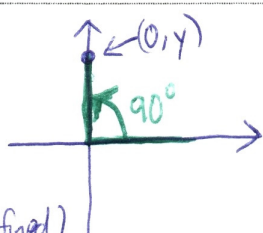
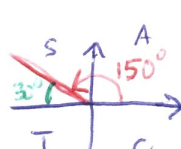
Victim:

Mr. N. Nolfi

Super work Mr. N.!!

KU	APP	COM
12/12	20/20	10/10

1. Evaluate each of the following expressions. For full credit, show all work! (12 KU)

(a) $625^{\frac{3}{2}}$ $= (\sqrt{625})^3$ $= 25^3$ $= 15625$	(b) $h(-3)$, if $h(x) = 5\left(\frac{2}{3}\right)^{-x}$ $h(-3) = 5\left(\frac{2}{3}\right)^{-(-3)}$ $= 5\left(\frac{2}{3}\right)^3 = \left(\frac{5}{1}\right)\left(\frac{8}{27}\right) = \frac{40}{27}$
(c) $\sec 300^\circ$ $= \frac{1}{\cos 300^\circ}$ $= \frac{1}{\cos 60^\circ}$ $= \frac{1}{\left(\frac{1}{2}\right)} = 2$ 	(d) $\tan 90^\circ$ is undefined because division by zero is undefined $(\tan 90^\circ = \frac{y}{0})$, which is undefined 
(e) t_4, if $t_n = -3(2^{n+1})$ $t_4 = -3(2^{4+1})$ $= -3(2^5)$ $= -3(32)$ $= -96$	(f) $g(150^\circ)$, if $g(\theta) = 5 \tan^2 \theta - 2 \sin \theta + \sec \theta$ $g(150^\circ) = 5 \tan^2 150^\circ - 2 \sin 150^\circ + \sec 150^\circ$ $= 5(-\tan 30^\circ)^2 - 2 \sin 30^\circ + \left(\frac{1}{-\cos 30^\circ}\right)$ $= 5\left(-\frac{1}{\sqrt{3}}\right)^2 - 2\left(\frac{1}{2}\right) - \frac{1}{\left(\frac{\sqrt{3}}{2}\right)}$ $= \frac{5}{1}\left(\frac{1}{3}\right) - 1 - \frac{2}{\sqrt{3}}$ $= \frac{5}{3} - \frac{3}{3} - \frac{2\sqrt{3}}{3}$ $= \frac{2-2\sqrt{3}}{3}$ 

2. Simplify each of the following expressions. For full credit, show all work! (6 APP)

(a) $\frac{-2x}{2x+y} - \frac{3y}{2y+x}$ $= \frac{-2x(2y+x) - 3y(2x+y)}{(2x+y)(2y+x)}$ $= \frac{-4xy - 2x^2 - 6xy - 3y^2}{(2x+y)(2y+x)}$ $= \frac{-2x^2 - 10xy - 3y^2}{(2x+y)(2y+x)}$	(b) $\frac{(a^{-3}b^{-2})^{-7}}{(a^{-1}b^{-2})^5} = \frac{a^{21}b^{14}}{a^{-5}b^{-10}}$ $= a^{21-(-5)} b^{14-(-10)}$ $= a^{26} b^{24}$
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3. Solve each of the following equations. For full credit, show all work! (8 APP)

(a) $6+z=5z^2$

$$\therefore 5z^2 - z - 6 = 0$$

$$\therefore 5z^2 + 5z - 6z - 6 = 0$$

$$\therefore 5z(z+1) - 6(z+1) = 0$$

$$\therefore (z+1)(5z-6) = 0$$

$$\therefore z+1=0 \text{ or } 5z-6=0$$

$$\therefore z=-1 \text{ or } z=\frac{6}{5}$$

$$\begin{aligned} 6(5) &= 30 \\ 5(5) &= 25 \\ 5+(-6) &= -1 \end{aligned}$$

(b) $\frac{4}{s+1} - \frac{5}{s+2} = \frac{3}{s}$ Multiply both sides by $s(s+1)(s+2)$

$$\therefore \frac{s(s+1)(s+2)}{1} \left(\frac{4}{s+1} - \frac{5}{s+2} \right) = \frac{s(s+1)(s+2)}{1} \left(\frac{3}{s} \right)$$

$$\therefore 4s(s+2) - 5s(s+1) = 3(s+1)(s+2)$$

$$\therefore 4s^2 + 8s - 5s^2 - 5s = 3(s^2 + 3s + 2)$$

$$\therefore -s^2 + 3s = 3s^2 + 9s + 6$$

$$\therefore 4s^2 + 6s + 6 = 0$$

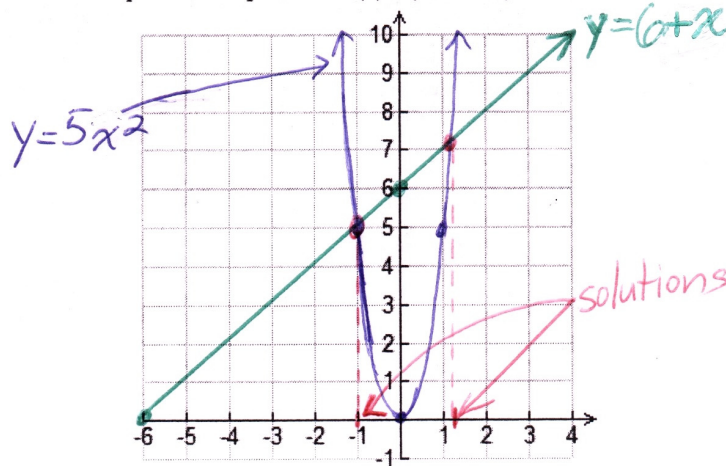
$$\therefore 2(2s^2 + 3s + 3) = 0$$

$$\therefore 2s^2 + 3s + 3 = 0$$

$$b^2 - 4ac = 3^2 - 4(2)(3) = -15 < 0$$

$\therefore$ there are no real roots.

4. Give a graphical representation of the equation in question 3(a). (5 COM)



5. Fully factor each of the following expressions. For full credit, show all work! (6 APP)

(a) $18w^8z^{10} - 21w^8z^9 - 9w^8z^8$

$$= 3w^8z^8(6z^2 - 7z - 3)$$

$$= 3w^8z^8(6z^2 - 9z + 2z - 3)$$

$$= 3w^8z^8[3z(2z-3) + 1(2z-3)]$$

$$= 3w^8z^8(2z-3)(3z+1)$$

$$\begin{aligned} 6(-3) &= -18 \\ -9(2) &= -18 \\ -9+2 &= -7 \end{aligned}$$

(b) $(2a-3)^2 - x^2 + 2xy - y^2$

$$= (2a-3)^2 - (x^2 - 2xy + y^2)$$

$$= (2a-3)^2 - (x-y)^2$$

$$= [2a-3+(x-y)][2a-3-(x-y)]$$

$$= (2a+x-y-3)(2a-x+y-3)$$