Math 4
1-4 Chunking Practice 2 & Review **NO CALCULATOR!!**

Name KEY
Date

For Numbers 1-6, solve for x.

1) $x^6 + 7x^3 - 8 = 0$

$(x^3)^2 + 7(x^3) - 8 = 0$

Let $u = x^3$

$u^2 + 7u - 8 = 0$

$u \cdot u = u^2$, $8 = 8u$, $-1 = -1u$, $7u$ ✓

$(u+8)(u-1) = 0$

$u+8=0$ $\quad u-1=0$

$u=-8$ $\quad u=1$

$x^3=-8$ $\quad x^3=1$

$\sqrt[3]{x^3} = \sqrt[3]{-8}$ $\quad \sqrt[3]{x^3} = \sqrt[3]{1}$

$x=-2$ $\quad x=1$

2) $9(\log_3 x)^2 - 28\log_3 x + 3 = 0$

let $u = \log_3 x$

$9u^2 - 28u + 3 = 0$

$9u \cdot u = 9u^2$, $-1 = -1u$, $-3 = -27u$, $-28u$ ✓

$(9u-1)(u-3) = 0$

$9u-1=0$ $\quad u-3=0$

$u=\frac{1}{9}$ $\quad u=3$

$\log_3 x = \frac{1}{9}$ $\quad \log_3 x = 3$

$3^{\frac{1}{9}} = x$ $\quad 3^3 = x$

simplify

$27 = x$

3) $2\tan^2 x + 6\tan x = 8$

$2\tan^2 x + 6\tan x - 8 = 0$

let $u = \tan x$

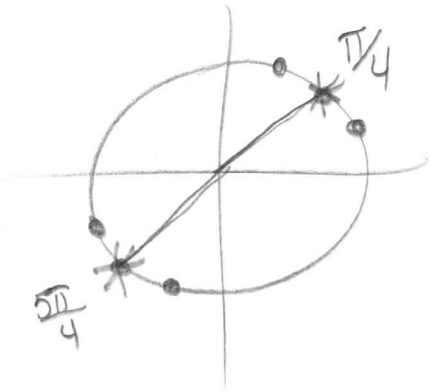
$2u^2 + 6u - 8 = 0$

$2(u^2 + 3u - 4)$

$u \quad 4 = 4u$

$u \quad -1 = -1u$

$3u$ ✓



$(2)(u+4)(u-1) = 0$

$2 = 0 \qquad u + 4 = 0 \qquad u - 1 = 0$

$\phi \qquad u = -4 \qquad u = 1$

$\tan x = -4 \qquad \tan x = 1$

ϕ

$\boxed{x = \frac{\pi}{4} \text{ AND } \frac{5\pi}{4}}$

4) $3x^5 - 24x^3 - 27x = 0$

$(3x)(x^4 - 8x^2 - 9) = 0$

$(3x)((x^2)^2 - 8x^2 - 9) = 0$

let $u = x^2$

$(3x)(u^2 - 8u - 9) = 0$

$u \quad -9 = -9u$

$u \quad 1 = u1$

$-8u$ ✓

$(3x)(u-9)(u+1)$

$3x = 0 \qquad u - 9 = 0 \qquad u + 1 = 0$

$x = 0 \qquad u = 9 \qquad u = -1$

$x^2 = 9 \qquad x^2 = -1$

$\sqrt{x^2} = \pm\sqrt{9} \qquad \sqrt{x^2} = \pm\sqrt{-1}$

$x = \pm 3 \qquad x = \pm i$

NON-REAL SOLUTION

5) $3(\ln x)^2 - 2 = 5\ln x$

$3(\ln x)^2 - 5\ln x - 2 = 0$

let $u = \ln x$

$3u^2 - 5u - 2 = 0$

$3u \quad 1 = 1u$

$u \quad -2 = -6u$

$-5u$

$(3u+1)(u-2) = 0$

$3u+1=0 \qquad u-2=0$

$u = -1/3 \qquad u = 2$

$\ln x = -\frac{1}{3} \qquad \ln x = 2$

$e^{-\frac{1}{3}} = x \qquad e^2 = x$

6) $3x^{15} + 4x^9 = 4x^3$

$3x^{15} + 4x^9 - 4x^3 = 0$

$x^3(3x^{12} + 4x^6 - 4) = 0$

$(x^3)(3(x^6)^2 + 4x^6 - 4) = 0$

let $u = x^6$

$(x^3)(3u^2 + 4u - 4) = 0$

$3u \quad -2 = -2u$

$u \quad 2 = 6u$

$4u$ ✓

$(x^3)(3u-2)(u+2) = 0$

$x^3 = 0 \qquad 3u-2=0 \qquad u+2=0$

$x = 0 \qquad u = \frac{2}{3} \qquad u = -2$

$x^6 = \frac{2}{3} \qquad x^6 = -2$

$x = \pm\sqrt[6]{\frac{2}{3}} \qquad x = \pm\sqrt[6]{-2}$ ← NON-REAL solution

$i^2 = -1$

$\sqrt[6]{2 \cdot -1}$

$\sqrt[6]{2} \cdot \sqrt[6]{-1}$

Use the parametric equations below to answer questions 7 & 8. **NO CALCULATOR!**

7) Use the table below to help you sketch a graph of the parametric equations over the interval $-2 \le t \le 2$.

$$\begin{cases} x(t) = t + 2 \\ y(t) = -t^2 + t - 1 \end{cases}$$

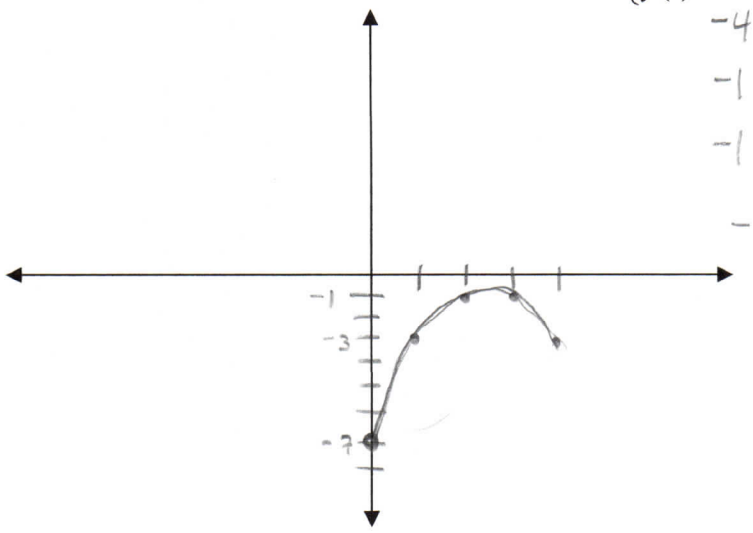
$-4-2-1$

$-1-1-1$

$-1+1-1$

$-4+2-1$

t	$x(t)$	$y(t)$
-2	0	-7
-1	1	-3
0	2	-1
1	3	-1
2	4	-3



8) Convert the equations above to rectangular form by eliminating a parameter. Simplify!

$x = t + 2$

$x - 2 = t$

$y = -(t)^2 + (t) - 1$

$y = -(x-2)^2 + (x-2) - 1$

$= -(x-2)(x-2) + (x-2) - 1$

$= -(x^2 - 4x + 4) + (x-2) - 1$

$= -x^2 + 4x - 4 + x - 2 - 1$

$y = -x^2 + 5x - 7$