Honors Math 3 – Unit 2 Remediation Sheet Name Key

Show All work!

1) Simplify and Classify by degree and number of terms. A. $(-8d^3 - 7) - (-d^3 - d^2 - 6)$

$-8d^3 - 7 + d^3 + d^2 + 6$

$-7d^3 + d^2 - 1$

B. $x(x-3) - 2x(x-3)$ Cubic Tri.

$x^2 - 3x - 2x^2 + 6x$

$-x^2 + 3x$ Quad B.

2) Write a polynomial function in **standard form** with the roots $0, \frac{-2}{5}, 3$

$y = x(x-3)(5x+2)$

$y = x(5x^2 - 13x - 6)$

$y = 5x^3 - 13x^2 - 6x$

3) Solve to find all the roots. $x^3 - 64 = 0$

$(x-4)(x^2+4x+16) = 0$

$x = 4$

$x^2 + 4x + 4 = -16 + 4$

$(x+2)^2 = -12$

$x + 2 = \pm 2i\sqrt{3}$

$-2 \pm 2i\sqrt{3}$

4) Solve to find all the roots. $8x^3 - 1 = 0$

$(2x-1)(4x^2+2x+1) = 0$

$x = \frac{1}{2}$

$x = \frac{-2 \pm \sqrt{4 - 4(4)(1)}}{2(4)} = \sqrt{-12}$

$x = \frac{-2 \pm 2i\sqrt{3}}{8}$

$x = \frac{-1 \pm i\sqrt{3}}{4}$

5) Divide using synthetic division.
$(x^4 - 6x^2 - 27) \div (x+2)$

$-2 \mid 1 \quad 0 \quad -6 \quad 0 \quad -27$

$\quad\quad -2 \quad 4 \quad 4 \quad -8$

$\quad 1 \quad -2 \quad -2 \quad 4 \quad -35$

$1x^3 - 2x^2 - 2x + 4 + \frac{-35}{x+2}$

6) Divide using long division.
$(7x^3 + 11x^2 + 7x + 5) \div (x^2 + 1)$ $7x + 11$

$x^2 + 0x + 1 \overline{)\, 7x^3 + 11x^2 + 7x + 5}$

$-7x^3 \downarrow \quad +7x \downarrow$

$11x^2 + 0x + 5$

$-11x^2 + 0x + 11$

-6

7) Solve to find all zeros.
$f(x)x^3 - 6x^2 + 4x + 16$ $\{4, 1\pm\sqrt{5}\}$

4 | 1 −6 4 16
↓ 4 −8 −16
1 −2 −4 | 0

$x^2 - 2x - 4 = 0$
$x^2 - 2x + \boxed{1} = 4 + 1$
$(x-1)^2 = 5$ $x = 1 \pm \sqrt{5}$
$x - 1 = \pm\sqrt{5}$

8) Solve to find all zeros.
$f(x) = x^3 - 9x^2 + 28x - 30$ $\{3, 3\pm i\}$

3 | 1 −9 28 −30
↓ 3 −18 30
1 −6 10 | 0

$x^2 - 6x + 10 = 0$
$x^2 - 6x + \boxed{9} = -10 + \boxed{9}$
$(x-3)^2 = -1$ $x = 3 \pm i$
$x - 3 = \pm i$

9) You want to make an open top box from cardboard. The original cardboard is 20 X 30. Find the maximum volume and the length of the cut. Round to the nearest hundredth.

$V = (20-2x)(30-2x)x$

Max Volume: 1056.31 unit^3
Length: 3.92 units

10) Is $(x-3)$ a factor of $x^3 - 4x^2 + x + 6 = 0$? If so, find the remaining factors.

3 | 1 −4 −1 6
↓ 3 −3 −6
1 −1 −2 | 0

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

11) Solve: $x^4 - 12x^2 - 64 = 0$

−64: −16, 4; −16 + 4 = −12

$x^4 - 16x^2 + 4x^2 - 64 = 0$
$x^2(x^2-16) + 4(x^2-16) = 0$
$(x^2+4)(x^2-16) = 0$
$x^2 = -4$ $x^2 = 16$
$x = \pm 2i$ $x = \pm 4$

12) Solve: $x^4 - x^2 - 72 = 0$

−72: −1, 8; −1 + 8 = 7

$x^4 - 9x^2 + 8x^2 - 72 = 0$
$x^2(x^2-9) + 8(x^2-9) = 0$
$(x^2+8)(x^2-9) = 0$
$x^2 = -8$ $x^2 = 9$
$x = \pm 2i\sqrt{2}$ $x = \pm 3$

13) Find the discriminant and describe the roots of:
$3x^2 + 2x - 8 = 0$ and $x^2 - 2x = -7$

$(2)^2 - 4(3)(-8)$
100
2 Real Rational Roots

$(-2)^2 - 4(1)(7)$
-24
2 Imaginary Roots

14) Solve by completing the square
$x^2 - 6x - 15 = 0$

$x^2 - 6x + \boxed{9} = 15 + \boxed{9}$
$(x-3)^2 = 24$
$x - 3 = \pm\sqrt{24}$
$x = 3 \pm 2\sqrt{6}$