Unit 7 Review Name Kelly - l^2

(Your most favorite Unit 7 all year!)

Let's start by simplifying these terms into terms with only positive exponents.

1. $\left(\frac{-3x^{-2}y}{y^3}\right)^3 = \frac{(-3)^3 x^{-6} y^3}{y^9} = \frac{-27y^3}{x^6y^9} = \boxed{\frac{-27}{x^6y^6}}$

2. $\left(\frac{-5a^{-8}b^{-1}}{ab^2}\right) = -5a^{-9}b^{-3} \boxed{= \frac{-5}{a^9b^3}}$

3. $(7x^2y^5)^{-1}$ $= 7^{-1}x^{-2}y^{-5} = \frac{1}{7^1x^2y^5} = \boxed{\frac{1}{7x^2y^5}}$

Evaluate the function at the given value using synthetic substitution. Check your answer using direct substitution.

4. $f(a) = -2a^3 - 3a^2 + 20a + 2$ at $a = -4$

$$\begin{array}{r|rrrr} -4 & -2 & -3 & 20 & 2 \\ & & 8 & -20 & 0 \\ \hline & -2 & 5 & 0 & 2 \end{array}$$

$\boxed{f(-4) = 2}$

$-2(-4)^3 - 3(-4)^2 + 20(-4) + 2$
$= -2(-64) - 3(16) - 80 + 2$
$128 - 48 - 80 + 2$
$\boxed{= 2}$

SAME, DAWG!

5. $g(z) = 8a^3 - 10$ at $z = -3$

$$\begin{array}{r|rrrr} -3 & 8 & 0 & 0 & -10 \\ & & -24 & 72 & -216 \\ \hline & 8 & -24 & 72 & -226 \end{array}$$

$\boxed{g(-3) = -226}$

$8(-3)^3 - 10$
$8(-27) - 10$
$-216 - 10$
$\boxed{= -226}$

SAME, DAWG!

Describe the end behavior of the following functions.

6. $f(x) = -x^3 + 3x^2 - 20$

as $x \to -\infty, f(x) \to \infty$
as $x \to \infty, f(x) \to -\infty$

7. $f(x) = 3x - 2x^4$

as $x \to -\infty, f(x) \to -\infty$
as $x \to \infty, f(x) \to -\infty$

8. Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

$f(x) = 2x^3 + 6x^2 + 2x - 3$

$f(x) = -2x^3 + 6x^2 + 2x - 3$

Zeros: $(-2.27, 0)$ $(.53, 0)$ $(-1.26, 0)$

y-intercept: $(0, -3)$

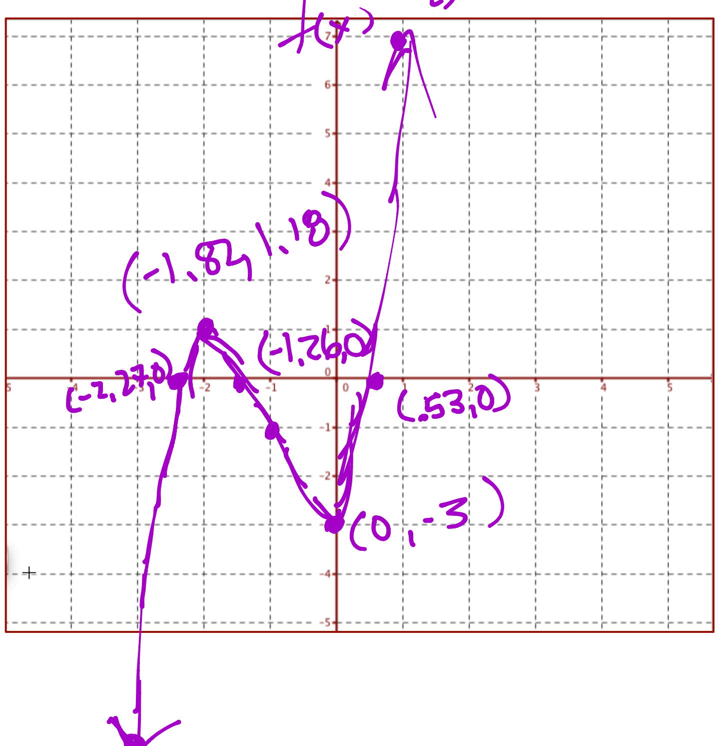
Extrema: Rel. Max $(-1.82, 1.18)$

Rel min $(0, -3)$

End Behavior:

$x \to -\infty, f(x) \to -\infty$

$x \to \infty, f(x) \to \infty$



x	f(x)
-3	-9
-2	1
-1	-1
0	-3
1	7
2	41
3	111

Factor each sum or difference in cubes. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

9. $27x^3 - 1$

$a^3 = (3x)^3 \quad b^3 = (-1)^3$ $\boxed{(3x-1)(9x^2+3x+1)}$

10. $8 + 64x^3$

$a^3 = 2^3 \quad b^3 = (4x)^3$

$\boxed{(2+4x)(4-8x+16x^2)}$

11. Divide $(k^4 + 7k^3 - 17k^2 + 2k - 63)$ by $(k + 9)$ using long division.

$k^3 - 2k^2 + k - 7$

$k+9 \,\overline{)\, k^4 + 7k^3 - 17k^2 + 2k - 63}$

$-(k^4 + 9k^3)$

$-2k^3 - 17k^2$

$-(-2k^3 - 18k^2)$

$k^2 + 2k$

$k^2 + 9k$

$-7k - 63$

$-7k - 63$

0

SAME, DAWG!

12. Now check #11 using synthetic division.

-9	1	7	-17	2	-63
		-9	18	-9	63
	1	-2	1	-7	0

$\Rightarrow \boxed{k^3 - 2k^2 + k - 7}$

13. Is $(k + 9)$ a factor of $(k^4 + 7k^3 - 17k^2 + 2k - 63)$?

yes, Because the remainder $= 0$

For 14 – 16, factor using the most appropriate method.

14. $12x^4 - 13x^2 + 3$

QUAD FORM! 36, -13

$\boxed{(4x^2-3)(3x^2-1)}$

15. $16m^3 - 6m^2 + 24m - 9$

GROUPING

$2m^2(8m-3) + 3(8m-3)$

$\boxed{(8m-3)(2m^2+3)}$

16. $2a^3 + 12a^2 + 10a$

GCF: $2a(a^2+6a+5)$

$\boxed{2a(a+5)(a+1)}$

Solve.

GROUPING

17. $d^6 - 4d^4 - 9d^2 + 36 = 0$

$d^4(d^2-4) - 9(d^2-4) = 0$

$(d^2-4)(d^4-9) = 0$

$(d+2)(d-2)(d^2+3)(d^2-3) = 0$

$d+2=0 \mid d-2=0 \mid d^2+3=0 \mid d^2-3=0$

$d=-2 \mid d=2 \mid d=\pm i\sqrt{3} \mid d=\pm\sqrt{3}$

$\boxed{\{\pm 2, \pm i\sqrt{3}, \pm\sqrt{3}\}}$

18. $x^3 - 3x^2 - 5x = -15$

$x^3 - 3x^2 - 5x + 15 = 0$

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

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

$x^2-5=0 \mid x-3=0$

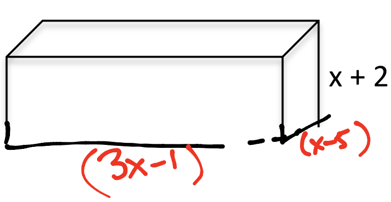
$x=\pm\sqrt{5} \mid x=3$

$\boxed{\{\pm\sqrt{5}, 3\}}$

Application

19. Suppose you know the volume of the following prism is V = $3x^3 - 10x^2 - 27x + 10$. If one side is (x + 2), find the lengths of the two other sides.

DIVIDE → BY



-2	3	-10	-27	10
		-6	32	-10
	3	-16	5	0

$\Rightarrow 3x^2 - 16x + 5$

$(3x-1)(x-5)$

$(3x-1)$ & $(x-5)$