

Midchapter 3 review

Date _____ Period _____

Simplify each expression.

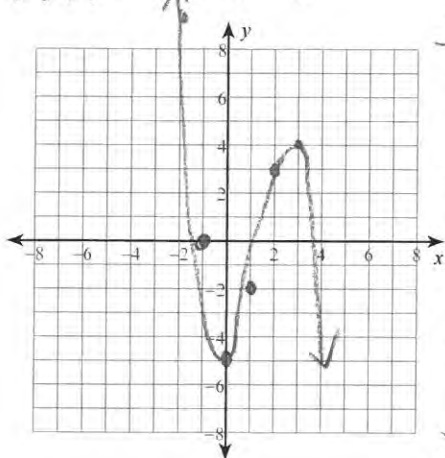
1) $(4n^2 + 8n^3 - 1) + (3n^3 + 7n^2 - 3)$
 $11n^3 + 11n^2 - 4$

2) $(3x^2 + 2x + 8x^4) - (6x^4 + 6x^2 - x)$
 $2x^4 - 3x^2 + 3x$

3) $(3b^3 - 8b^4 - b^2) + (5b^4 + b^3 - 8b^2)$
 $-3b^4 + 4b^3 - 9b^2$

Sketch the graph of each function. End behavior

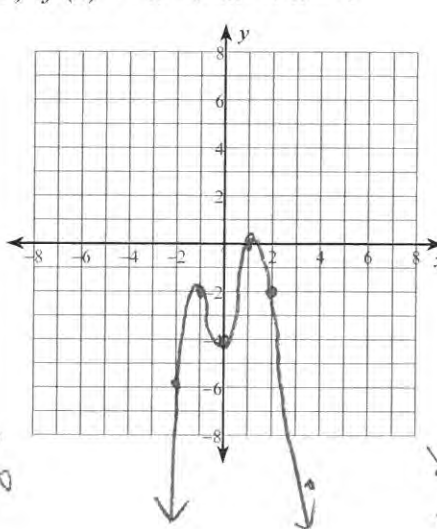
4) $f(x) = -x^3 + 4x^2 - 5$



x	y
-3	58
-2	19
-1	0
0	-5
1	-2
2	3
3	4

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

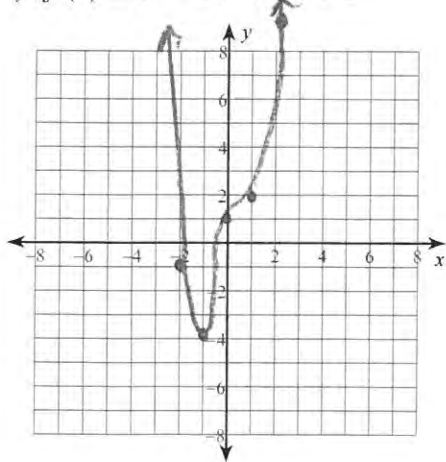
5) $f(x) = -x^4 + 4x^2 + x - 4$



x	y
-3	-52
-2	-6
-1	-2
0	-4
1	0
2	-2
3	-46

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

6) $f(x) = x^4 - 3x^2 + 3x + 1$



x	y
-3	46
-2	-1
-1	-4
0	1
1	2
2	11
3	64

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

Put each polynomial in standard form, Name each polynomial, and state the leading coefficient.

7) $4x^2 - x^3 - 7x^5$
 $-7x^5 - x^3 + 4x^2$ degree 5 LC -7

8) $-4r - 9r^2 - 7r^3 - 6$
 $-7r^3 - 9r^2 - 4r - 6$ cubic degree 3 LC -7

9) $9x + 4$
 linear LC 9 degree 1

10) $10x$
 linear LC 10 degree 1

Find each product.

11) $(3m^2 + 5m - 7)(-3m - 4)$
 $-9m^3 - 15m^2 + 21m - 12m^2 - 20m + 28$
 $\rightarrow -9m^3 - 27m^2 + 1m + 28$

12) $(x-3)(x+2)(x-5)$
 $x^2 - 3x + 2x - 6 = x^2 - x - 6$
 $(x-5)(x^2 - x - 6) = x^3 - x^2 - 6x - 5x^2 + 5x + 30$
 $x^3 - 6x^2 - x + 30$

Factor each.

13) $x^3 + 10x^2 + 25x = 0$
 $x(x^2 + 10x + 25) = 0$
 $x(x+5)(x+5) = 0$

14) $x^3 - 2x^2 + 4x - 8 = 0$
 $x^2(x-2) + 4(x-2) \rightarrow (x^2+4)(x-2)$

15) $x^3 + 1 = 0$ sum of cubes
 $(x+1)(x^2 - x + 1)$

16) $x^4 - x^2 - 12 = 0$
 $(x^2-4)(x^2+3)$
 $(x+2)(x-2)(x^2+3)$

Divide. 17&19 use long division, 18 and 20 use Synthetic division

17) $(10p^3 - 58p^2 + 41p - 14) \div (p-5)$
 $10p^2 - 8p + 1 - 9/p-5$

18) $(r^3 + 3r^2 - 24r + 26) \div (r+7)$
 $r^2 - 4r + 4 - 2/r+7$

19) $(a^3 - 2a^2 - 74a + 48) \div (a+8)$
 $a^2 - 10a + 6$

20) $(a^3 + a^2) \div (a+1)$
 a^2

Simplify. Your answer should contain only positive exponents.

21) $\frac{(-2y^3)^2}{2y^2} = \frac{4y^6}{2y^2} = 2y^4$

22) $\frac{(-y^2)^2}{x^{-3}y^4 \cdot x^{-2}y^3} = \frac{y^4}{x^{-5}y^7} = \frac{y^{-3}}{x^{-5}} = \frac{x^5}{y^3}$

23) $\left(\frac{x^4y^{-3} \cdot 2x^{-4}}{2x^{-1}y^0}\right)^{-1} = \frac{x^{-4}y^3 \cdot 2^{-1}x^4}{2^{-1}x^{-1}y^0}$
 $\frac{-y^3/x}{1}$

24) $\frac{yx^3}{(2xy^3)^2} = \frac{yx^3}{2^2x^2y^6} = \frac{x}{4y^3}$

25) $\frac{(2x^0y^4)^0 \cdot -x^{-3}}{-2x^2} = \frac{-x^{-3}}{-2x^2} = \frac{1}{2}x^{-5} = \frac{1}{2x^5}$

26) $\frac{2x^2y^{-1} \cdot 2x^{-3}}{(xy^2)^{-2}} = \frac{4x^{-1}y^{-1}}{x^{-2}y^{-4}} = 4x^1y^3$
 subtract.

Long division for 17:
 $p-5 \overline{) 10p^3 - 58p^2 + 41p - 14}$
 $-(10p^3 - 50p^2)$
 $-8p^2 + 41p$
 $-(-8p^2 + 40p)$
 $p - 14$
 $-(p - 5)$
 -9

Long division for 19:
 $a+8 \overline{) a^3 - 2a^2 - 74a + 48}$
 $-(a^3 + 8a^2)$
 $-10a^2 - 74a$
 $-(-10a^2 - 80a)$
 $6a + 48$
 $6a + 48$
 0