

Name: Key

Date: _____

Chapter 6 (6.1-6.4) Review

Section 6.1 – Properties of Exponents

For #1-7, simplify. Assume that no variable equals 0.

1) $c^{10} \cdot c^{-5} \cdot c^6$

c^{11}

2) $\frac{b^{12}}{b^2}$

b^{10}

3) $(a^6)^5$

a^{30}

4) $\left(\frac{a^2b}{a^{-3}b^2}\right)^{-1}$

$\frac{a^{-3}b^2}{a^2b} = \frac{b^2}{a^5a^2b} = \frac{b}{a^5}$

5) $\left(\frac{x^2y}{xy^3}\right)^2$

$\frac{x^4y^2}{x^2y^6} = \frac{x^2}{y^4}$

6) $\frac{2^3c^4d^2}{2^{-2}c^{-4}d^2}$

$\frac{2^3 2^2 c^4 c^4 d^2}{d^2} = 2^5 c^8 = 32c^8$

7) $\frac{2mn^2(3m^2n)^2}{12m^3n^4}$

$\frac{2mn^2(9m^4n^2)}{12m^3n^4} = \frac{18m^5n^4}{12m^3n^4} = \frac{3m^2}{2}$

Section 6.2 – Operations with Polynomials

For #8-9, determine whether each expression is a polynomial. If it is a polynomial, state the degree of the polynomial.

8) $5x^3 + 2xy^4 + 6xy$

Yes

Degree: 5

9) $25x^3z - x\sqrt{78}$

NO

10) $\frac{12m^8n^9}{(m-n)^2}$

NO

For #11-17, simplify.

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

$$3n^2 + 1 + 8n^2 - 8$$

$$\boxed{11n^2 - 7}$$

12) $(6w - 11w^2) - (4 + 7w^2)$

$$6w - 11w^2 - 4 - 7w^2$$

$$\boxed{-18w^2 + 6w - 4}$$

13) $-9(y^2 - 7w)$

$$\boxed{-9y^2 + 63w}$$

14) $-9r^4y^2(-3ry^7 + 2r^3y^4 - 8r^{10})$

$$\boxed{27r^5y^9 - 18r^7y^6 + 72r^{14}y^2}$$

15) $(7a + 9y)(2a - y)$

$$14a^2 - 7ay + 18ay - 9y^2$$

$$\boxed{14a^2 + 11ay - 9y^2}$$

16) $(x^2 + 5y)^2$

$$(x^2 + 5y)(x^2 + 5y)$$

$$x^4 + 5x^2y + 5x^2y + 25y^2$$

$$\boxed{x^4 + 10x^2y + 25y^2}$$

17) $(x + y)(x^2 - 3xy + 2y^2)$

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

$$\boxed{x^3 - 2x^2y - xy^2 + 6y^3}$$

Section 6.3 – Dividing Polynomials

For #18-20, simplify.

18) $\frac{18a^3 + 30a^2}{3a}$

$$\frac{18a^3}{3a} + \frac{30a^2}{3a}$$

$$\boxed{6a^2 + 10a}$$

19) $\frac{24mn^6 - 40m^2n^3}{4m^2n^3}$

$$\frac{24mn^6}{4m^2n^3} - \frac{40m^2n^3}{4m^2n^3}$$

$$\boxed{\frac{6n^3}{m} - 10}$$

20) $\frac{60a^2b^3 - 48b^4 + 84a^5b^2}{12ab^2}$

$$\frac{60a^2b^3}{12ab^2} - \frac{48b^4}{12ab^2} + \frac{84a^5b^2}{12ab^2}$$

$$\boxed{5ab - \frac{4b^2}{a} + 7a^4}$$

For #21-23, simplify using synthetic division.

21) $(3v^2 - 7v - 10)(v - 4)^{-1}$

$$\begin{array}{r|rrr} 4 & 3 & -7 & -10 \\ & & 12 & 20 \\ \hline & 3 & 5 & 10 \end{array}$$

$$\boxed{3v + 5 + \frac{10}{v-4}}$$

22) $(2x^2 - 5x - 4) \div (x - 3)$

$$\begin{array}{r|rrr} 3 & 2 & -5 & -4 \\ & & 6 & 3 \\ \hline & 2 & 1 & -1 \end{array}$$

$$\boxed{2x + 1 + \frac{-1}{x-3}}$$

23) $\frac{y^3 - y^2 - 6}{y + 2}$

$$\begin{array}{r|rrrr} -2 & 1 & -1 & 0 & -6 \\ & & -2 & 6 & -12 \\ \hline & 1 & -3 & 6 & -18 \end{array}$$

$$\boxed{y^2 - 3y + 6 + \frac{-18}{y+2}}$$

Section 6.4

For #24-28, state the degree and leading coefficient of each polynomial in one variable. If it is not a polynomial in one variable, explain why.

24. $(2x - 1)(4x^2 + 3)$ $8x^3 + 6x - 4x^2 - 3$ LC: 8
D: 3

25. $18 - 3y + 5y^2 - y^5 + 7y^6$ LC: 7
D: 6

26. $u^3 + 4u^2w^2 + w^4$ NO

27. Find $p(-1)$ and $p(2)$ for the function $p(x) = -2x^3 + 5x + 3$.

$$\begin{aligned} p(-1) &= -2(-1)^3 + 5(-1) + 3 \\ &= -2(-1) - 5 + 3 \\ &= 2 - 5 + 3 \end{aligned}$$

$$\begin{aligned} p(2) &= -2(2)^3 + 5(2) + 3 \\ &= -2(8) + 10 + 3 \\ &= -16 + 10 + 3 \end{aligned}$$

28. Find $-4p(a)$ for the function $p(x) = 4x^2 - 3$.

$$p(-1) = 0$$

$$p(2) = -3$$

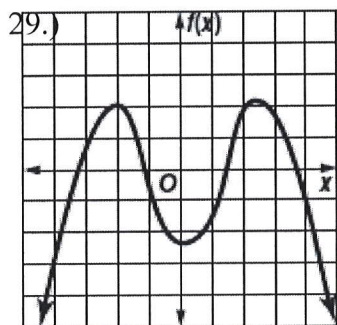
$$p(a) = 4a^2 - 3$$

$$= -4(4a^2 - 3)$$

$$-4p(a) = -16a^2 + 12$$

For #29 and 30, determine the following:

- Describe the end behavior.
- Determine whether it represents an odd-degree or an even-degree polynomial function.
- State the number of real zeroes.

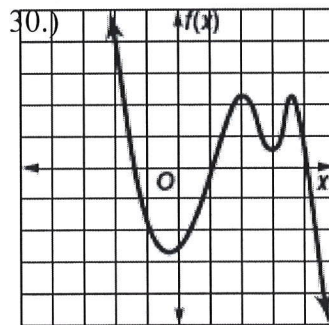


Even / Positive

4 real zeroes

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

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



Odd / Negative

3 real zeroes

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

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