

Name: Key

Date: _____

Hour: _____

Algebra 2

Practice Test Chapter 6 – Sections 6.1 – 6.7

Simplify the following:

1. $(4x^3y^0)(3x^{-5}y)^2$

$$4 \cdot x^3 \cdot 3 \cdot x^{-10} \cdot y^2$$

$$4 \cdot 9 x^3 \cdot x^{-10} \cdot y^2$$

$$36 x^{-7} y^2$$

$$\boxed{\frac{36y^2}{x^7}}$$

$$2. \frac{6x^3y^2z^3}{36x^5yz^{-4}} = \frac{6}{36} \cdot \frac{x^3}{x^5} \cdot \frac{y^2}{y} \cdot \frac{z^3}{z^{-4}}$$

$$= \frac{1}{6} \cdot \frac{1}{x^2} \cdot \frac{y}{1} \cdot \frac{z^7}{1}$$

$$\boxed{\frac{yz^7}{6x^2}}$$

3. $(10x^3 + 5x^2 - 4) + (x^2 - 2x - 5)$

$$\boxed{10x^3 + 6x^2 - 2x - 9}$$

4. $(4y - 5)^2$

$$(4y - 5)(4y - 5)$$

$$\boxed{16y^2 - 40y + 25}$$

5. $(7a^3 - 3a^2 + a) - (8a^3 - 4a^2 - 8)$

$$\boxed{-a^3 + a^2 + a + 8}$$

6. $(2x^2 + 1)(3x - 2)$

$$\boxed{6x^3 - 4x^2 + 3x - 2}$$

Simplify using **LONG DIVISION**.

7. $(6x^3 - 4x^2 - 2x + 8) \div (2x + 1)$

$$\begin{array}{r}
 3x^2 - \frac{7}{2}x + \frac{3}{4} + \frac{\frac{31}{4}}{2x+1} \\
 2x+1 \overline{) 6x^3 - 4x^2 - 2x + 8} \\
 \underline{\ominus 6x^3 + 3x^2} \\
 -7x^2 - 2x \\
 \underline{\oplus -7x^2 + \frac{7}{2}x} \\
 \frac{9}{2}x + 8 \\
 \underline{\ominus \frac{3}{2}x + \frac{3}{4}} \\
 \frac{31}{4}
 \end{array}$$

Divide using **SYNTHETIC DIVISION**.

8. $(3x^3 + 8x - 25) \div (x + 3)$

$$3x^3 + 0x^2 + 8x - 25$$

$$3x^2 - 9x + 35 - \frac{130}{x+3}$$

$$\begin{array}{r}
 -3 \overline{) 3 \quad 0 \quad 8 \quad -25} \\
 \underline{-9 \quad 27 \quad -105} \\
 3 \quad -9 \quad 35 \quad -130
 \end{array}$$

Find $p(-3)$ first by **regular substitution**, then by **synthetic substitution**. Show your work!

9. Regular Substitution

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

$$\begin{aligned}
 P(-3) &= 3(-3)^3 - 2(-3)^2 + 6(-3) - 4 \\
 &= \boxed{-121}
 \end{aligned}$$

10. Synthetic Substitution

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

$$\begin{array}{r}
 -3 \overline{) 3 \quad -2 \quad 6 \quad -4} \\
 \underline{-9 \quad +33 \quad -117} \\
 3 \quad -11 \quad 39 \quad \boxed{-121}
 \end{array}$$

Use **regular substitution** to find the following:

11. Find $r(4c)$ if $r(x) = x^3 - 2x + 1$

$$r(4c) = (4c)^3 - 2(4c) + 1$$

$$= \boxed{64c^3 - 8c + 1}$$

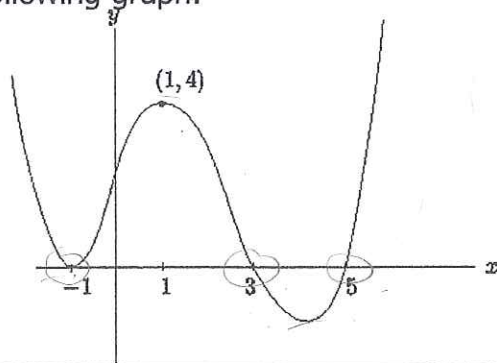
For questions 12 – 15, consider the polynomial function,

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

$$= x^3 - 6x^2 + 4x + 3$$

<p>12. What is the degree of this function?</p> <p style="text-align: center;">3rd</p>	<p>13. What is the leading coefficient?</p> <p style="text-align: center;">1</p>																				
<p>14. Show a table of values. Between what consecutive values of x are each real zero located?</p> <table style="display: inline-table; vertical-align: top;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr><td>-2</td><td>-37</td></tr> <tr><td>-1</td><td>-8</td></tr> <tr><td>0</td><td>3</td></tr> <tr><td>1</td><td>2</td></tr> <tr><td>2</td><td>-5</td></tr> <tr><td>3</td><td>-12</td></tr> <tr><td>4</td><td>-13</td></tr> <tr><td>5</td><td>-2</td></tr> <tr><td>6</td><td>27</td></tr> </tbody> </table> <p style="margin-left: 100px;">Between</p> <p style="margin-left: 100px;">$x = -1, 0$</p> <p style="margin-left: 100px;">$x = 1, 2$</p> <p style="margin-left: 100px;">$x = 5, 6$</p> <p style="margin-left: 100px;">↑</p>	x	y	-2	-37	-1	-8	0	3	1	2	2	-5	3	-12	4	-13	5	-2	6	27	<p>15. Using the table of values from #14, identify where the relative max and relative mins are located.</p> <p>Relative max is located at: <u>$x = 0$</u></p> <p>Relative min is located at: <u>$x = 4$</u></p>
x	y																				
-2	-37																				
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2	-5																				
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4	-13																				
5	-2																				
6	27																				

For questions 16 – 19, use the following graph:



16. How many real zeroes does this function have?

3

17. What is the degree of this function?

4th

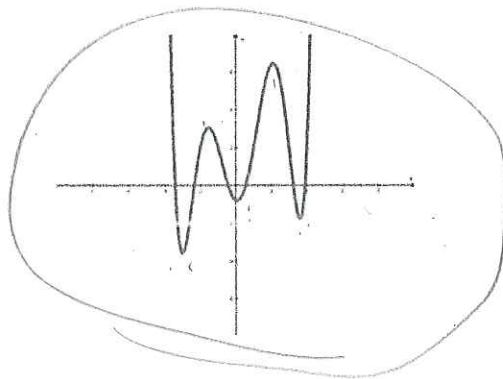
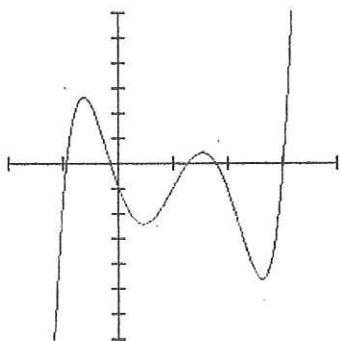
18. Describing end behavior, fill in the blank:

As $x \rightarrow -\infty, f(x) \rightarrow +\infty$.

19. Describing end behavior, fill in the blank:

As $x \rightarrow \infty, f(x) \rightarrow +\infty$.

20. Circle the graph the represents an even numbered function:



Given a polynomial and one of its factors, find the remaining factors of the polynomial.

21. $x^3 + 2x^2 - x - 2; (x + 1)$

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

$$x^2 + x - 2$$

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

22. $2x^3 + 4x^2 - 5x - 2; (x + 1)$

$$\begin{array}{r|rrrr} -1 & 2 & 4 & -5 & -2 \\ & & -2 & -2 & 7 \\ \hline & 2 & 2 & -7 & 5 \end{array}$$

↑
not = 0

$x+1$ is
not a
factor

