Accelerated Geom/Alg 2
Final Exam Review

Name________________ Date____________ Block______

**Perform the indicated operation.**

1. $(-7x^3 + 9x^2 - 4x + 3) + (10x^3 + 4x^2 - 8x - 9)$ 1. ________

$3x^3 + 13x^2 - 12x - 6$

2. $(5x^3 - 9x + 1) - (-2x^3 + 2x^2 - 10x + 11) - (5x - 9)$ 2. ________

$5x^3 - 9x + 1 + 2x^3 - 2x^2 + 10x - 11 - 5x + 9$

$7x^3 - 2x^2 - 4x - 1$

3. $(x^2 + 9x - 12)(7x + 4)$ 3. ________

| | $x^2$ | $9x$ | $-12$ |
|---|---|---|---|
| $7x$ | $7x^3$ | $63x^2$ | $-84x$ |
| $4$ | $4x^2$ | $36x$ | $-48$ |

$7x^3 + 67x^2 - 48x - 48$

4. Factor completely: $4x^4 - 76x^3 - 480x^2$ 4. ________

$4x^2(x^2 - 19x - 120)$

$4x^2(x+5)(x-24)$

5. Factor completely: $8x^2 - 14x - 15$ 5. ________

$-120$

| | |
|---|---|
| 1 | 120 |
| 2 | 60 |
| 3 | 40 |
| 4 | 30 |
| 5 | 24 |
| 6 | -20 |

| | $4x$ | $3$ |
|---|---|---|
| $2x$ | $8x^2$ | $6x$ |
| $-5$ | $-20x$ | $-15$ |

$(4x+3)(2x-5)$

6. a) Expand the following: $(2x - 9)^4$ 6a.________

$$\begin{aligned} &1\,(2x)^4 \\ &-4\,(2x)^3(9) \\ &6\,(2x)^2(9)^2 \\ &-4\,(2x)\,(9)^3 \\ &1\,(9)^4 \end{aligned} = 16x^4 - 288x^3 + 1944x^2 - 216x + 6561$$

b) Express $(2x - 9)^4 + (2x + 9)^4$ as the sum of three terms. 6b.________

$$\begin{array}{r} 16x^4 - \cancel{288x^3} + 1944x^2 - \cancel{216x} + 6561 \\ +\ 16x^4 + \cancel{288x^3} + 1944x^2 + \cancel{216x} + 6561 \\ \hline 32x^4 + 3888x^2 + 13122 \end{array}$$

7. a) Find the $x^4$ **term** in the expansion of $(x-5)^{10}$.

7a. $3281250x^4$

$\underset{{}_{10}C_6}{\underline{210}}(x^4)(5)^6$

b) Hence, find the $x^5$ **term** in the expansion of $7x(x-5)^{10}$.

7b. $22968750x^5$

$7x(3281250x^4)$

8. Find the **coefficient** containing $x^{14}$ in the expansion of $(3+4x^2)^9$

8. 5308416

$\underset{{}_9C_7}{\underline{36}}(3)^2(4x^2)^7$

9. Given that $(5-\sqrt{3})^3 = a + b\sqrt{3}$ where $a$ and $b$ are integers, find $a$ and $b$.

9. $a =$ 170

$b =$ -78

$1\,(5)^3$
$-3\,(5)^2(\sqrt{3})$
$3\,(5)(\sqrt{3})^2 = 125 - 75\sqrt{3} + 45 - 3\sqrt{3}$
$-1\,(\sqrt{3})^3$ $\quad 170 - 78\sqrt{3}$

10. Use synthetic division to divide the following:

10. $6x^3 - 12x^2 + 21x - 42 + \frac{70}{x+2}$

$$6x^4 - 3x^2 - 14 \div x + 2$$

$$\begin{array}{r|rrrrr} -2 & 6 & 0 & -3 & 0 & -14 \\ & \downarrow & -12 & 24 & -42 & 84 \\ \hline & 6 & -12 & 21 & -42 & \boxed{70} \end{array}$$

11. Use the completed synthetic division to write the original rational function in the form $\frac{a(x)}{b(x)}$ as well as the "new" form $q(x) + \frac{r(x)}{b(x)}$.

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$$\begin{array}{r|rrrr} -4 & 1 & 2 & 3 & 2 \\ & & -4 & 8 & -44 \\ \hline & 1 & -2 & 11 & -42 \end{array}$$

$\frac{a(x)}{b(x)} = \frac{x^3+2x^2+3x+2}{x+4}$

$q(x) + \frac{r(x)}{b(x)} = x^2 - 2x + 11 + \frac{-42}{x+4}$