

Name: Key

Date: \_\_\_\_\_

**Identify the characteristics:**

1. $k(x) = 23 - 4x^3 + 2x^2 - 3x^4$	2. $g(x) = -5x^3 + 7x - 3x^2$
Standard Form: <u><math>-3x^4 - 4x^3 + 2x^2 + 23</math></u>	Standard Form: <u><math>-5x^3 - 3x^2 + 7x</math></u>
Leading Coefficient: <u><math>-3</math></u>	Leading Coefficient: <u><math>-5</math></u>
Constant: <u><math>23</math></u>	Constant: <u>None / 0</u>
Name polynomial by degree and # of terms: <u>Quartic Polynomial</u>	Name polynomial by degree and # of terms: <u>Cubic Trinomial</u>

**Classify Polynomials by Degree and Terms**

3. $f(x) = x^4 + 2x - 2$	4. $2x^4 - x$	5. $-3x^2$
Degree Name: <u>Quartic</u>	Degree Name: <u>Quartic</u>	Degree Name: <u>Quadratic</u>
# of Terms Name: <u>Trinomial</u>	# of Terms Name: <u>Binomial</u>	# of Terms Name: <u>Monomial</u>

**Combining Functions**Let  $f(x) = 2x - 1$ , <sup>5</sup>  $g(x) = 3x^2 - 2$ , <sup>25</sup> and  $k(x) = x^2 + 2x - 5$  <sup>10</sup> to find the following:

6. $f(x) - g(x)$ $(2x-1) - (3x^2-2)$ $2x-1-3x^2+2$ <u><math>-3x^2+2x+1</math></u>	7. $3g(x) - 2f(x)$ $3(3x^2-2) - 2(2x-1)$ $9x^2-6-4x+2$ <u><math>9x^2-4x-4</math></u>	8. $f(2) + g(2)$ $2(2)-1 + 3(2)^2-2$ $4-1+12-2$ <u><math>13</math></u>
9. $f(x) \cdot g(x)$ $(2x-1)(3x^2-2)$ $6x^3-4x-3x^2+2$ <u><math>6x^3-3x^2-4x+2</math></u>	10. $2f(x) - k(x)$ $2(2x-1) - (x^2+2x-5)$ $4x-2-x^2-2x+5$ <u><math>-x^2+2x+3</math></u>	11. $f(x) \cdot k(x)$ $(2x-1)(x^2+2x-5)$ $2x^3+4x^2-10x-1x^2-2x+5$ <u><math>2x^3+3x^2-12x+5</math></u>
12. $4f(x) - 3g(x)$ $4(2x-1) - 3(3x^2-2)$ $8x-4-9x^2+6$ <u><math>-9x^2+8x+2</math></u>	13. $k(2) - g(3)$ <sup>★</sup> $(2)^2+2(2)-5 - 3(3)^2+2$ $4+4-5-27+2$ <u><math>-22</math></u>	14. $2f(x) \cdot 3g(x)$ $2(2x-1) \cdot 3(3x^2-2)$ $(4x-2)(9x^2-6)$ $36x^3-24x-18x^2+12$ <u><math>36x^3-18x^2-24x+12</math></u>

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Use the Binomial Theorem and Pascal's Triangle to expand the binomial

<p>15. <math>(x+2)^4</math></p> $1x^4 + 4x^3 \cdot 2 + 6x^2 \cdot 2^2 + 4x \cdot 2^3 + 1 \cdot 2^4$ $1x^4 + 8x^3 + 24x^2 + 32x + 16$	<p>16. <math>(x-3)^3</math></p> $1x^3 - 3x^2 \cdot 3 + 3x \cdot 3^2 - 1 \cdot 3^3$ $1x^3 - 9x^2 + 27x - 27$
<p>17. <math>(2x+1)^3</math></p> $1(2x)^3 + 3(2x)^2 \cdot 1 + 3(2x) \cdot 1^2 + 1 \cdot 1^3$ $8x^3 + 12x^2 + 6x + 1$	<p>18. <math>(x+5)^3</math></p> $1x^3 + 3x^2 \cdot 5 + 3x \cdot 5^2 + 1 \cdot 5^3$ $1x^3 + 15x^2 + 75x + 125$
<p>19. <math>(3x+2)^3</math></p> $1(3x)^3 + 3(3x)^2 \cdot 2 + 3(3x) \cdot 2^2 + 1 \cdot 2^3$ $27x^3 + 54x^2 + 36x + 8$	<p>20. <math>(x-2)^5</math></p> $1x^5 - 5x^4 \cdot 2 + 10x^3 \cdot 2^2 - 10x^2 \cdot 2^3 + 5x \cdot 2^4 - 1 \cdot 2^5$ $1x^5 - 10x^4 + 40x^3 - 80x^2 + 80x - 32$

**\*\*Create Pascal's Triangle here to help with #15-20\*\***

$$\begin{array}{cccccc}
 & & & & & 1 & & & & & \\
 & & & & & & 1 & & 1 & & \\
 & & & & & & & 1 & & 2 & & 1 \\
 & & & & & & & & 1 & & 3 & & 3 & & 1 \\
 & & & & & & & & & 1 & & 4 & & 6 & & 4 & & 1 \\
 & & & & & & & & & & 1 & & 5 & & 10 & & 10 & & 5 & & 1
 \end{array}$$