2.1 – 2.2 Test Review

Name: _____
Date: _____ Hour: ___

Polynomial, Linear and Quadratic Functions, Power and Monomial

1. **Linear functions:**

A. General Form: $y = mx + b$

B. Equation to find the slope: $m = (y_2 - y_1)/(x_2 - x_1)$

C. Write the equation for the linear function with the **points** (3, −6) and (7, 10).

$x_1, y_1 \quad x_2, y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - (-6)}{7 - 3} = \frac{16}{4} = 4$

$y = 4x + b$

→ plug in a point

$-6 = 4(3) + b$

$-6 = 12 + b$

$b = -18$

Final Equation: $y = 4x - 18$

2. **Quadratic Functions:**

A. General Form: $y = ax^2 + bx + c$

B. Vertex Form: $y = a(x-h)^2 + k$

C. Vertex: (h, k)

D. Axis of Symmetry: $x = h$

E. Find the quadratic equation that has a **vertex** of (−3, 1) and **point** (−5, 2).

$h \quad k \qquad x \quad y$

$y = a(x-h)^2 + k$

$2 = a(-5 - (-3))^2 + 1$

$-1 \qquad\qquad -1$

$1 = a(-2)^2$

$\frac{1}{4} = \frac{4 \cdot a}{4} \rightarrow a = 1/4$

Final Equation: $y = 1/4(x+3)^2 + 1$

F. Find the vertex and axis of symmetry of the following quadratic functions.

i. $f(x) = -2(x+4) - 5$

$y = a(x-h)^2 + k$

A. Vertex: $(h, k) = (-4, -5)$

B. Axis of Symmetry: $x = h \rightarrow x = -4$

ii. $f(x) = 2x^2 - 8x - 7$

$h = \frac{-b}{2a} = \frac{-(-8)}{2(2)} = \frac{8}{4} = 2$

$k = f(h) = f\left(\frac{-b}{2a}\right) = f(2)$

$2(2)^2 - 8(2) - 7 = 2(4) - 16 - 7 = 8 - 16 - 7 = -15$

A. Vertex: $(2, -15)$

B. Axis of Symmetry: $x = 2$

3. Polynomial Functions, Power Functions and Monomial Functions:

Function	Form	Restriction(s)	Example
Polynomial	$f(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots + a_2 x^2 + a_1 x^1 + a_0$	$n \neq$ negative #, fraction, or radical	$f(x) = x^3 + 3x^2 + 7x - 2$ degree = 3 leading coeff. = 1
Power	$f(x) = K \cdot x^a$	$K \neq 0$ $a \neq 0$	$f(x) = 2x^{-3}$ Power = -3; C.O.V. = 2
Monomial	$f(x) = K \cdot x^n$	$n \neq$ a negative number	$f(x) = 3 \cdot x^4$ degree = 4; Leading Coeff. = 3

A. $f(x) = -2x^6 + x^2 + 7$

Circle the correct type:

(Polynomial) Power Monomial

Degree/Power: 6

Leading Coefficient/C.O.V.: -2

B. $f(x) = -\frac{5}{x^2} \rightarrow -5 \cdot x^{-2}$

Circle the correct type:

Polynomial (Power) Monomial

Degree/Power: -2

Leading Coefficient/C.O.V.: -5

G. **Power Functions:**

a. Write the statements below as a power function equation.

y varies directly with the fourth power of x.	$y = Kx^4$
y is directly proportional to the cube root of x.	$y = Kx^{1/3}$ or $y = K\sqrt[3]{x}$
y is inversely proportional to the cube of x.	$y = Kx^{-3}$ or $y = K/x^3$
p varies inversely with m.	$p = km^{-1}$ or $p = K/m$

b. Write a sentence that expresses the relationship in the formula, using the language of variation or proportion.

$y = 3x^{-2}$	y varies inversely with the square of x with the constant of variation of 3.
$y = \frac{1}{4}x^5$	y varies directly with (is directly proportional to the fifth power of x, with the C.O.V. of 1/4
$y = 4.7x^{\frac{1}{2}}$	y varies directly with the square root of x with the C.O.V. of 4.7.
$A = \pi r^2$ (A = area and r = radius)	The area, A, varies directly with the square of the radius, r, with C.O.V. of π.

C.O.V. = constant of variation