Foundational Review Test: Pre-Review Version

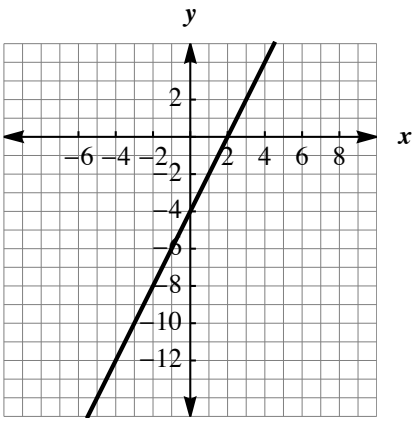
First & Last Name: _____ **Class:** _____

Potential Honor Students: You are expected to attempt the challenge questions.

Section 1: Linear Equations and Graphs

1. Which ordered pair is a solution to the equation $y = -3x + 8$?
a. $(-1, 12)$ **b.** $(2, 2)$ **c.** Both $(-1, 12)$ and $(2, 2)$ **d.** Neither

2. Determine the slope and intercepts of the line: m =___ x-intercept: (___, ___) y-intercept: (___, ___)



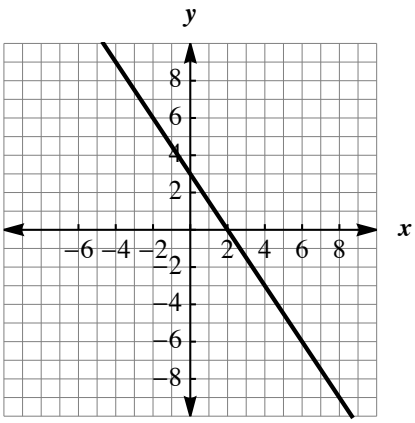
3. What is the slope of the line through $(-2, -3)$ and $(7, 13)$? m = _____

4. What is the equation of the horizontal line through $(-2, -3)$?

5. What is the y-intercept of $y = -7x - 3$? y-intercept: (____, ____)

6. Write the equation of the line whose slope is -5 and the y-intercept is $(0, 4)$.

7. Find the equation of the line graphed below in slope-intercept form. Use exact numbers.



8. Find the equation of the line through $(-4, 10)$ and $(3, -5)$ in point-slope form.

Section 1: Challenge Questions

9. Determine the intercepts of the line $ax - by = -9$: x-intercept: (____, ____) y-intercept: (____, ____)

10. What is the slope of the line through $(5, \pi)$ and $(-1, 3)$? m = _____

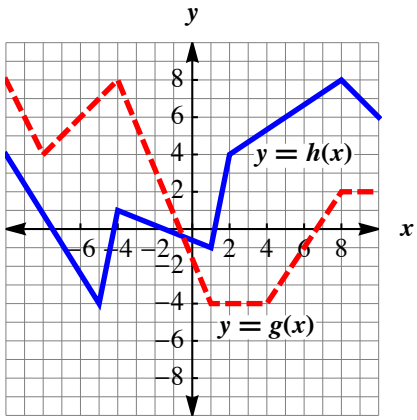
11. Find the equation of the line through $(-7, -1/2)$ and $(12, 1/4)$ in point-slope form.

12. Find the equation of the line through $(-1/3, -1/2)$ and $(3/4, 4)$ in slope-intercept form.

Section 2: Functions

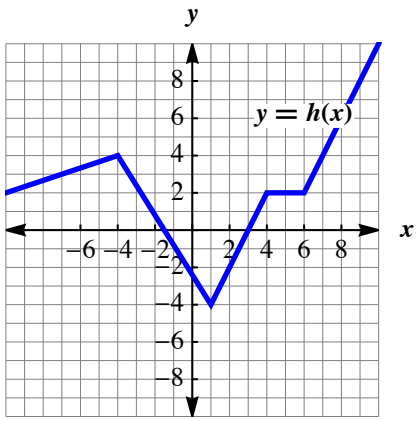
1. If $f(x) = -7x + 6$, find: **a.** $f(0)$ **b.** $f(1)$ **c.** $f(-2)$ **d.** $f(-5)$

2. Use the graph to find: **a.** $h(-4)$ **b.** $g(1)$ **c.** $2\,h(2) - 2\,g(-7)$ **d.** $3\,g(4) - h(5)$



3. If $g(x) = -5x - 3$, then $g(\quad) = 17$.

4. For the following graph: **a.** If $h(x) = 4$, then $x =$ **b.** If $h(x) = -4$, then $x =$



5. For a given input value r, the function h outputs a value q to satisfy the equation $q + 6 = 2\,(r - 1)$. Write a formula for $h(r)$ in terms of r.

6. Maria is a barista. $T(n)$ models how much of a tip she makes, in dollars, for her n^{th} order on a certain day. What does the statement $T(6) = G$ mean?

a. Maria makes \$6 for her G^{th} order.

b. The amount Maria makes for her G^{th} order and 6^{th} order are equal.

c. Maria makes G dollars on her 6^{th} order.

7. State the domain of $f(t) = -5t + 2$ using interval notation:

8. For the following graph,

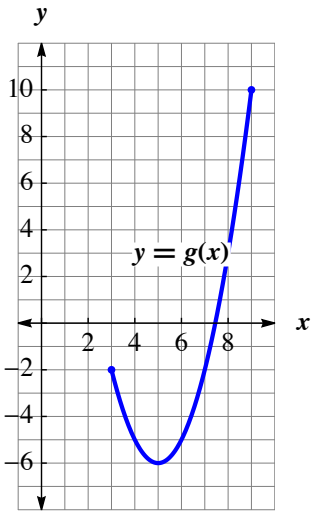
a. using interval notation, write the **i.** domain of g **ii.** range of g

b. write the ordered pairs for all the **i.** local minima **ii.** local maxima

c. write the ordered pairs for all the **i.** absolute minima **ii.** absolute maxima

d. using interval notation, write the intervals where g is **i.** positive **ii.** negative

e. using interval notation, write the intervals where g is **i.** decreasing **ii.** increasing



Section 2: Challenge Questions

9. If $j(k) = 2^{k+1}$ find $j(2)$.

10. If $h(x) = \frac{x}{2} - \frac{2}{3}$, then $h(\quad) = \frac{-5}{3}$.

11. For a given input value x, the function g outputs a value y to satisfy the equation $2y - 4x = 6(x - 2)$. Write a formula for $g(x)$ in terms of x.

12. State the domain and range of $f(x) = -\sqrt{x^2 - 9}$ using interval notation.

Section 3: Piecewise Functions

1. What is $g(-3)$ if

$$g(x) = \begin{cases} x^2 - 5 & \text{when } x \in (-\infty, -3] \\ 8x + 17 & \text{when } x \in (-3, 3) \\ (x-1)(x+6) & \text{when } x \in [3, \infty) \end{cases}$$

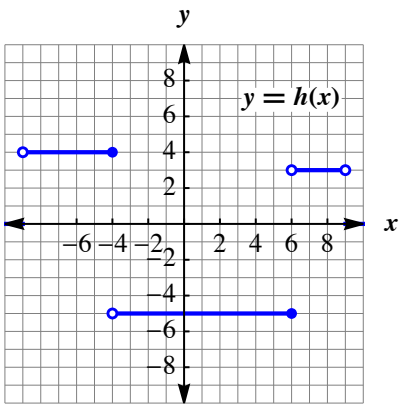
2. Use the graph to evaluate:

a. $h(-4.0001)$

b. $h(-4)$

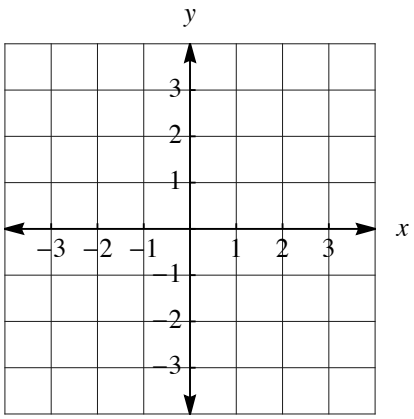
c. $h(-3.999)$

d. $h(6.0001)$

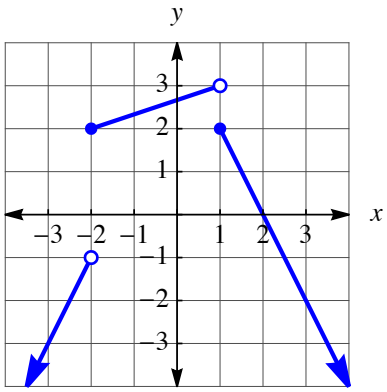


3. Graph the piecewise function

$$f(x) = \begin{cases} x - 3 & x < 1 \\ -2x + 4 & x \geq 1 \end{cases}$$



4. Write the piecewise function for the following graph:



Section 3: Challenge Questions

5. What is $h(5)$ and $h(8)$ if

$$h(x) = \begin{cases} x^3 & \text{when } x \leq 5 \\ \sqrt{x-5} & \text{when } 5 < t < 0 \\ \dfrac{x^3}{x-8} & \text{when } t > 0 \end{cases}$$

Section 4: Exponents and Radicals

1. Rewrite $\frac{w^5}{w^7}$ in the form w^n.

2. Simplify $(x^{-9} \cdot y^{-3})^{-4}$ as much as possible.

3. Simplify the square root expression: $\sqrt{\frac{144}{49}}$

4. Simplify the following radical expression: $\sqrt[5]{\frac{243}{32}}$

5. Rewrite $\sqrt[3]{2/b}$ in exponential form, $a\,b^n$.

6. Rewrite $\frac{13\sqrt[5]{w}}{5w^4}$ in the form $k\,w^n$.

7. Simplify $\sqrt{128\,y^{11}\,z^{21}}$.

Section 5: Polynomials

1. Pick the expression that matches this description: A polynomial of the 7th degree with a leading coefficient of 5 and a constant term of 6.

a. $7x^6 - 2x^2 + 5$ **b.** $6x^5 + x^4 + 7$ **c.** $5x^7 + 3x^4 - 6$ **d.** $5x^7 - 8x^3 + 6$

2. What is the degree of the polynomial $-3q^{12} + 22q^{10} - q + 8$?

3. Add the following polynomial (your answer should be a polynomial in standard form):

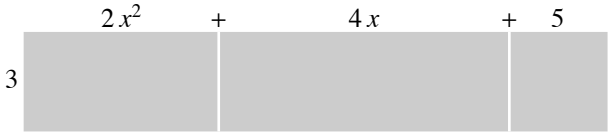
$$\left(-5h^4 + 7h^3 - 2h^2 - 8\right) + \left(2h^3 + 4h^2 - 8\right)$$

4. Subtract the following polynomial (your answer should be a polynomial in standard form).

$$\left(-5h^4 + 7h^3 - 2h^2 - 8\right) - \left(2h^3 + 4h^2 - 8\right)$$

5. Multiply $(q^5)(-2q^3)$ (your answer should be a monomial in standard form).

6. Express the area of the entire rectangle (your answer should be a polynomial in standard form):



7. Expand $-3g^5(7h + 9gh - 11g^2)$ (your answer should be a polynomial in standard form).

8. Find the values for a and b that would make the following equality true.

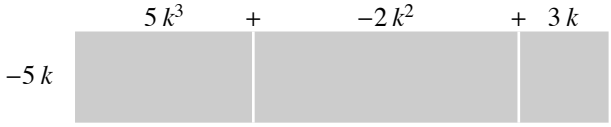
$$5a\left(\frac{1}{2}x^2y + bxy - 3y^2\right) = 20x^2y - 20xy - 120y^2$$

Section 5: Challenge Questions

9. Multiply $(ap^w q^x)(bp^y q^z)$.

10. $T = -4g^2 + 2g - 3$ and $N = -5g^2 + 4g + 7$.
    - **a.** What is $N + N$?
    - **b.** What is $N - T$?
    - **c.** What is $T - N$?
    - **d.** What is $T - N - N + T$?

11. Express the area of the entire rectangle (your answer should be a polynomial in standard form).



Section 6: Factors and Divisibility (Challenge/Honors)

1. Find the missing factor F that makes the equality true.

$$-27b^{10} = (F)\left(9b^5\right)$$

2. A rectangle has an area of $120p^7$ square meters and a length of $20p^2$ meters. What is the width of the rectangle?

3. What is the greatest common factor of $32x^4$, $24x^3$ and $8x^2$?

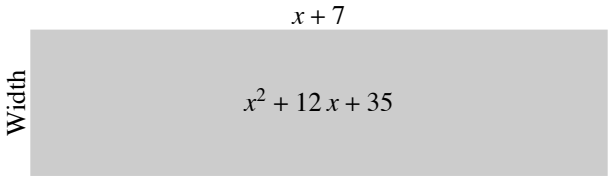
4. Factor $x(x + 5) - 3(x + 5)$ as the product of two binomials.

5. Factor $36r^8 - 24r^7 + 84r^4$ by its greatest common monomial factor.

6. Factor $x^2 - 16x - 17$ as the product of two binomials.

7. Factor $x^2 + 3x - 40$ as the product of two binomials.

8. The rectangle below has an area of $x^2 + 12x + 35$ square meters and a length of $x + 7$ meters. What expression represents the width of the rectangle?



9. Factor $3x^2 + 5x - 12$ completely.
10. Factor $p^2 + 5pq - 24q^2$ completely.
11. Factor $-3r^4 + 9r^3 + 30r^2$ completely.
12. Factor $a^2 - 2a + 3ab - 6b$ as the product of two binomials.
13. Factor $x^2 - 64$ as the product of two binomials.

Section 7: Logarithms

1. Evaluate the following logarithms:
   - **a.** $\log_2 8 =$
   - **b.** $\log_3 81 =$
   - **c.** $\log_{1/2} \frac{1}{4} =$
   - **d.** $\log_{10} \frac{1}{100} =$
   - **e.** $\log_{1/3} 9 =$
   - **f.** $\log_{0.2}(0.04) =$
   - **g.** $\log_5 1 =$
   - **h.** $\log_2 0 =$
2. Solve for b:
   - **a.** $\log_b 125 = 3$
   - **b.** $\log_b 81 = 2$
   - **c.** $\log_b 16 = -2$
   - **d.** $\log_b \frac{1}{1000} = -3$
3. Expand the following:
   - **a.** $\log(100x) =$
   - **b.** $\log_3\left(\frac{81}{w}\right) =$
   - **c.** $\log_2\left(\sqrt[4]{x}\right) =$
   - **d.** $\log_b\left(\frac{x^3 y^2}{z^5}\right) =$
4. Condense the following:
   - **a.** $\frac{1}{3}\log(x) =$
   - **b.** $\log_2(x) + 3\log_2(y) =$
   - **c.** $\frac{1}{3}\log_7(a) - \frac{1}{2}\log_7(b) =$
   - **d.** $2\log_3(11) - \frac{1}{2}\log_3(5) + \log_3(x) =$