

ALG III
5.1-5.3 Review

Name: _____

1. Use the properties of exponents to determine whether the following statements are true or false. If a statement is false, rewrite the right side of the equation to make a true statement.

a. $\frac{3^{10}}{3^4} = 3^{2.5}$ FALSE
 $\frac{3^{10}}{3^4} = 3^{10-4} = 3^6$

b. $(3x)^3 = 9x^3$ FALSE
 $(3x)^3 = 3^3 x^3 = 27x^3$

2. Use properties of exponents to simplify each expression. Circle your answers.

a. $\left(\frac{1}{2}\right)^3 = \frac{1^3}{2^3} = \frac{1}{8}$

b. $4^2 \cdot 4^5 = 4^{2+5} = 4^7$

c. $7^{-2} = \frac{1}{7^2} = \frac{1}{49}$

d. $\left(\frac{3}{4}\right)^{-1} = \frac{4}{3}$

e. $(2^2)^3 = 2^{2 \cdot 3} = 2^6 = 64$

f. $(2 \cdot 3)^2 = 6^2 = 36$

g. $x^{-1}y^2 = \frac{y^2}{x}$

h. $x^2y^{-1} = \frac{x^2}{y}$

i. $(x^2)^3 = x^{2 \cdot 3} = x^6$

j. $\left(\frac{x}{3}\right)^2 = \frac{x^2}{3^2} = \frac{x^2}{9}$

k. $\left(\frac{2}{y}\right)^{-3} = \left(\frac{y}{2}\right)^3 = \frac{y^3}{2^3} = \frac{y^3}{8}$

l. $\frac{x^8}{x^2} = x^{8-2} = x^6$

m. $\frac{2^5 x^7}{2^4 x^4} = 2^{5-4} x^{7-4} = 2x^3$

n. $\frac{2x^3(yx^2)^{-1}}{4x^7} = \frac{2x^3y^{-1}x^{-2}}{4x^7}$
 $= \frac{1}{2}x^{3+(-2)-7}y^{-1}$
 $= \frac{1}{2}x^{-6}y^{-1}$
 $= \frac{1}{2x^6y}$

o. $\frac{(2x^5)^3}{3x^7} = \frac{2^3 x^{5 \cdot 3}}{3x^7}$
 $= \frac{8x^{15}}{3x^7}$
 $= \frac{8}{3}x^{15-7}$
 $= \frac{8x^8}{3}$

3. Write the polynomial in descending powers. State the degree.

a. $4x - 3x^3 + 8x^2 = -3x^3 + 8x^2 + 4x$ Third degree

b. $-38 - p^5 - 29p^3 + 47p = -p^5 - 29p^3 + 47p - 38$ Fifth degree

4. If $f(x) = 3x^2 - 4x$ and $g(x) = -9x^2 + 9x - 8$

$$(f + g)(3) = -47$$

a. Find $f(3) + g(3) = (3(3)^2 - 4(3)) + (-9(3)^2 + 9(3) - 8)$
 $= 27 - 12 - 81 + 27 - 8$
 $= -47$

$$(f - g)(-2) = 82$$

b. Find $f(-2) - g(-2) = 3(-2)^2 - 4(-2) - (-9(-2)^2 + 9(-2) - 8)$
 $= 12 + 8 - (-36 - 18 - 8)$
 $= 20 + 36 + 18 + 8$
 $= 82$

$$(f + g)(x) = (3(x)^2 - 4(x)) + (-9(x)^2 + 9(x) - 8)$$

c. Find $= 3x^2 - 4x - 9x^2 + 9x - 8$
 $= 3x^2 - 9x^2 - 4x + 9x - 8$
 $= -6x^2 + 5x - 8$

$$(g - f)(x) = (-9(x)^2 + 9(x) - 8) - (3(x)^2 - 4(x))$$

d. Find $= -9x^2 + 9x - 8 - (3x^2 - 4x)$
 $= -9x^2 - 3x^2 + 9x + 4x - 8$
 $= -12x^2 + 13x - 8$

e. Find $(g - f)(0) = -12(0)^2 + 13(0) - 8 = -8$

4. Given the graphs of $f(x)$ and $g(x)$, find:

a.
$$\begin{aligned}(f + g)(-2) &= f(-2) + g(-2) \\ &= 4 + -1 \\ &= 3\end{aligned}$$

b.
$$\begin{aligned}(f - g)(0) &= f(0) - g(0) \\ &= 0 - (-2) \\ &= 2\end{aligned}$$

c.
$$\begin{aligned}(f - g)(2) &= f(2) - g(2) \\ &= 4 - (-3) \\ &= 7\end{aligned}$$

