

ACT

2009-
2010
PFA

① $f(x) = 4x + 1$ $g(x) = x^2 - 2$

$f(g(x)) = ?$

② WHICH number is a rational number?

Ⓐ $\sqrt{2}$ Ⓑ $\sqrt{\pi}$ Ⓒ $\sqrt{7}$ Ⓓ $\sqrt{\frac{5}{25}}$ Ⓔ $\sqrt{\frac{64}{49}}$

③ WHAT is the slope of the line parallel to the line $y = \frac{2}{3}x - 4$ in the standard (x,y) coordinate plane?

ANS:

① $f(x) = 4x + 1$

$$\begin{aligned}
 f(x^2 - 2) &= 4(x^2 - 2) + 1 \\
 &= 4x^2 - 8 + 1 \\
 &= \boxed{4x^2 - 7}
 \end{aligned}$$

② $\sqrt{\frac{64}{49}}$

$$= \frac{\sqrt{64}}{\sqrt{49}}$$

$$= \boxed{\frac{8}{7}}$$

RATIONAL

③ $m_{1/1} =$

$$\boxed{\frac{2}{3}}$$

• Homework review $\Rightarrow$ Pg. 192 # 4, 6, 12, 13, Pg. 193 # 26

④ $\boxed{(5, 1)}$

⑥ $\boxed{(-6, -8)}$

⑫ $\boxed{(2, -1)}$

⑬ $\boxed{(-12, 4)}$

⑳ $\boxed{(-1, 3, 4)}$

Summary of Exponent Rules

Multiplication
Rule

$$a^m \cdot a^n = a^{m+n}$$

EX) $(x^4 y^3)(x^5 y) = x^9 y^4$

EX) $8^3 \cdot 8^7 = 8^{10}$

Division
Rule

$m > n$

$$\frac{a^m}{a^n} = a^{m-n}$$

EX) $\frac{x^8}{x^3} = x^5$

EX) $\frac{5^{12}}{5^4} = 5^8$

Zero Exponent
Rule

Division Rule
where $m = n$

$$a^0 = 1$$

EXCEPT for
 $0^0 = 0$

EX) $(4x^3 y)^0 = 1$

EX) $5^0 = 1$

Negative Exponent
Rule

Division Rule
where $m < n$

$$a^{-n} = \frac{1}{a^n}$$

EX) $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

EX) $4x^{-3} = 4 \cdot \frac{1}{x^3} = \frac{4}{x^3}$

💡 Never leave a
negative exponent

Power To A Power
Rule

$$(a^m)^n = a^{m \cdot n}$$

EX) $(5^2)^5 = 5^{10}$

EX) $[(4^3)^2]^6 = [4^6]^6 = 4^{36}$

Group To A Power
Rule

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

EX) $(4x)^2 = 4^2 x^2 = 16x^2$

EX) $\left(\frac{2x}{y}\right)^3 = \frac{2^3 x^3}{y^3} = \frac{8x^3}{y^3}$

Ch. 5-1 Monomials

Monomial A number, a variable, or the product of a number and (multiplication) one or more variables.

Ⓔ 2, $2x$, $2x^3$, $-x$, $-xyz$, 5^{-1}
 $\frac{1}{3}x$, 2^2x , $25xy^2z^3$

NOT MONOMIALS $\frac{1}{x}$, $x+y$, x^{-1}

**Degree of
A Monomial**

the sum the exponents of the variables.
 (ADD)

<u>Monomial</u>	<u>Degree</u>
Ⓔ $2x$	1
$3x^2y$	2
$\frac{1}{2}xyz$	3
$5x^2y^3z^5$	10
8	0

Constants have
 A degree = 0

Simplifying Monomials

- get rid of parentheses
- leave NO negative exponents.

EX1
pg 222

$$(3x^3y^2)(-4x^2y^4)$$

$$\boxed{-12x^5y^6} \quad MR$$

EX2
pg 223

$$\frac{p^3}{p^8}$$

$$p^{3-8} = p^{-5} = \boxed{\frac{1}{p^5}} \quad DR, NER$$

EX3
pg 224

Ⓐ $(a^3)^6 = \boxed{a^{18}} \quad PP$

Ⓑ $(-2p^3s^2)^5 = (-2)^5 p^{15} s^{10} \quad GP, PP$
 $= \boxed{-32p^{15}s^{10}}$

Ⓒ $\left(\frac{-3x}{y}\right)^4 \quad \text{CAREFUL...}$

$$\frac{(-3)^4 x^4}{y^4} = \boxed{\frac{81x^4}{y^4}} \quad GP, PP$$

The $(-3)^4$ is
OFTEN MISSED.

Ⓓ $\left(\frac{a}{4}\right)^{-3} = \frac{1}{\left(\frac{a}{4}\right)^3} = \frac{1}{\frac{a^3}{64}} = \boxed{\frac{64}{a^3}} \quad NER, GP$

$$\begin{aligned}
 \overline{\text{Ex 4}} \quad \text{Pg 224} \quad \left(\frac{-2x^{3N}}{x^{2N}y^3} \right)^4 &= \left(\frac{-2x^{3N-2N}}{y^3} \right)^4 \\
 &= \left(\frac{-2x^N}{y^3} \right)^4 = \frac{(-2)^4 x^{4N}}{y^{12}} \\
 &= \boxed{\frac{16x^{4N}}{y^{12}}}
 \end{aligned}$$

Recall: Scientific Notation

$a \times 10^N$ where $1 \leq a < 10$
 and N is an integer

$$\begin{aligned}
 \textcircled{\text{Ex}} \quad 2500 &= 2.5 \times 10^3 \\
 1,000,000 &= 1 \times 10^6 \\
 0.003 &= 3 \times 10^{-3}
 \end{aligned}$$

$$\overline{\text{Ex 5}} \quad \text{Pg 225} \quad \textcircled{\text{A}} \quad 6,380,000 = 6.38 \times 10^6$$

$$\textcircled{\text{B}} \quad 0.000047 = 4.7 \times 10^{-5}$$

$$\overline{\text{Ex 6}} \quad \textcircled{\text{A}} \quad (4 \times 10^5)(2 \times 10^7) = \boxed{8 \times 10^{12}}$$

$$\textcircled{\text{B}} \quad (2.7 \times 10^{-2})(3 \times 10^6) = \boxed{8.1 \times 10^4}$$

$$\textcircled{\text{EX}} (6 \times 10^6)(8 \times 10^4)$$

$$= 48 \times 10^{10}$$

NOT in correct Sci. Not.

$$= 4.8 \times 10^{11}$$

$\uparrow$ $\uparrow$
 MAKE $\Rightarrow$ MAKE BIGGER
 SMALL BY ONE PLACE BY ONE PLACE

$$\textcircled{\text{EX}} 4800 \times 10^{12} = 4.800 \times 10^{15}$$

$$0.005 \times 10^6 = 5 \times 10^3$$

$$28605 \times 10^{-5} = 2.8605 \times 10^{-1}$$

! CAREFUL

Homework: • Memorize THE 6 Exponent rules

• Pg 226-227 #19-31 ODD

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44-58