

Advanced Algebra
Unit 6 Practice SWIG

Name: Key
Hour:

Target 6A. Simplify expressions using properties of exponents.

$(1+1+(-5)) = -3$

$15+15 = 30$

Simplify the given expression. Assume that no variable equals 0.

1. $15a(6ab^{15})(-10a^{-5}b^{15}) = 15 \cdot 6 \cdot (-10) \cdot a^1 \cdot a^1 \cdot a^{-5} \cdot b^{15} \cdot b^{15}$
 $= -900a^{-3}b^{30}$

2. $\frac{y^5 \cdot y^3}{y^{-2}} = \frac{y^8}{y^{-2}} = y^{8-(-2)} = y^{10}$

3. $\frac{(4x^3)^3}{12x^5} = \frac{4^3 x^9}{12x^5} = \frac{64x^9}{12x^5} = \frac{16}{3}x^{9-5} = \frac{16}{3}x^4$ or $\frac{16x^4}{3}$

Target 6B. Perform operations on polynomial functions.

4. Find $(f + g)(x)$ for the following functions: $f(x) = 12x^2 + 5x + 8$ and $g(x) = 3x + 6$

$f(x) + g(x)$

$$\begin{array}{r} 12x^2 + 5x + 8 \\ 3x + 6 \\ \hline 12x^2 + 8x + 14 \end{array}$$

5. Find $(f - g)(x)$ for the following functions: $f(x) = 14x + 18$ and $g(x) = -12x^2 + 7x + 24$

$f(x) - g(x)$

$$(14x + 18) - (-12x^2 + 7x + 24) \quad \text{Distribute } (-)$$

$$14x + 18 + 12x^2 - 7x - 24 = 12x^2 + 7x - 6$$

6. Find $(f \cdot g)(x)$ for the following functions: $f(x) = 3x^2 - 6x - 7$ and $g(x) = 13x - 9$

$f(x) \cdot g(x)$

	$3x^2$	$-6x$	-7
$13x$	$39x^3$	$-78x^2$	$-91x$
-9	$-27x^2$	$+54x$	$+63$

$39x^3 - 78x^2 - 91x - 27x^2 + 54x + 63$
 $= 39x^3 - 105x^2 - 37x + 63$

7. Find $\left(\frac{f}{g}\right)(x)$ for the following functions. $f(x) = x^2 - 5x + 6$ and $g(x) = x - 3$

$$\frac{f(x)}{g(x)} = \frac{x^2 - 5x + 6}{x - 3} = \frac{(x-2)(x-3)}{(x-3)}$$

$$= x - 2$$

$$\begin{array}{r} +6 \\ -2 \overline{) -3} \\ \underline{-5} \end{array}$$

$$\begin{array}{l} -2 \cdot (-3) = +6 \checkmark \\ -2 - 3 = -5 \checkmark \end{array}$$

Target 6C. Create composition of polynomial functions.

8. If $f(x) = \frac{4}{x-1}$ and $g(x) = x^3$ how would you **SET UP** $g(f(x))$?

To set up, $\left(\frac{4}{x-1}\right)^3$

So $g(f(x)) = \left(\frac{4}{x-3}\right)^3$
 set up

9. Find $g(h(x))$ given $g(x) = 12x$ and $h(x) = -12x - 3$.

$$12(-12x - 3) = -144x - 36$$

So $g(h(x)) = -144x - 36$

10. Find $h(g(x))$ given $g(x) = 12x$ and $h(x) = -12x - 3$.

$$-12(12x) - 3$$

$$-144x - 3$$

So $h(g(x)) = -144x - 3$