

Unit 4 test review

Simplify.

$$1. (12x^2 + 13x - 11) + (14x^2 - x - 13)$$

$$\underline{12x^2} + \underline{13x} - \underline{11} + \underline{14x^2} - \underline{x} - \underline{13}$$

$$\underline{(12x^2 + 14x^2)} + \underline{13x - x} - \underline{11 - 13}$$

$$\underline{26x^2 + 12x - 24}$$

$$2. (15u^3 + 18u) - (21u + 32u^2 - 26u^3)$$

$$\underline{15u^3} + \underline{18u} - \underline{21u} - \underline{32u^2} + \underline{26u^3}$$

$$\underline{15u^3 + 26u^3} - \underline{32u^2}$$

$$\underline{41u^3 - 3u - 32u^2}$$

OR

$$41u^3 - 32u^2 - 3u$$

$$3. (11x^3 - 5x^2) - (11 - 12x^3) + (-10 + 5x^3)$$

$$\underline{11x^3} - \underline{5x^2} - \underline{11} + \underline{12x^3} + \underline{-10} + \underline{5x^3}$$

$$\underline{11x^3 + 12x^3 + 5x^3} - \underline{5x^2} - \underline{11 + -10}$$

$$\underline{28x^3 - 5x^2 - 21}$$

$$4. 2x^4(13x^2 + 11x - 15)$$

$$2x^4 \cdot 13x^2 + 2x^4 \cdot 11x - 2x^4 \cdot 15$$

$$\underline{26x^{4+2}} + \underline{22x^{4+1}} - \underline{30x^4}$$

$$\underline{26x^6 + 22x^5 - 30x^4}$$

$$5. -7y(4y^3 - 9y^2 + 8y)$$

$$\underline{-7y \cdot 4y^3} - \underline{7y \cdot 9y^2} - \underline{7y \cdot 8y}$$

$$\underline{-28y^{1+3}} - \underline{63y^{1+2}} - \underline{56y^{1+1}}$$

$$\underline{-28y^4 - 63y^3 - 56y^2}$$

$$6. (x+12)(x-7)$$

	x	+ 12
x	x <sup>2</sup>	12x
-7	-7x	-84

$$(x+12)(x-7)$$

$$x(x) - 7x + 12x + 12(-7)$$

$$x^2 + 5x - 84$$

$$x^2 + \underline{12x} - \underline{7x} - 84$$

$$\underline{x^2 + 5x - 84}$$

7.  $(12r - 9)^2$

$(12r - 9)(12r - 9)$

	12r	-9
12r	$144r^2$	$-108r$
-9	$-108r$	81

$144r^2 - 108r - 108r + 81$   
 $\quad\quad\quad -108 - 108$

$144r^2 - 216r + 81$

8.  $(9z + 5)(2z - 7)$

	9z	+5
2z	$18z^2$	$10z$
-7	$-63z$	-35

$18z^2 + 10z - 63z - 35$   
 $\quad\quad\quad 10 - 63$

$18z^2 - 53z - 35$

Simplify and state the domain.

9.  $\frac{(5x+4)(x-12)}{(5x+4)}$

$x - 12$

Domain:

$5x + 4 \neq 0$   
 $\quad\quad\quad -4 \quad -4$

$5x \neq -4$   
 $\quad\quad\quad 5 \quad 5$

$x \neq -\frac{4}{5}$

10.  $\frac{(4x+1)}{(4x+1)(x-6)}$

$\frac{1}{x-6}$

Domain:

$4x + 1 \neq 0$   
 $\quad\quad\quad -1 \quad -1$

$4x \neq -1$   
 $\quad\quad\quad 4 \quad 4$

$x \neq -\frac{1}{4}$

$x - 6 \neq 0$   
 $\quad\quad\quad +6 \quad +6$

$x \neq 6$

Perform the indicated operations for the given functions.  
 $f(x) = -6x + 9$ ,  $g(x) = \frac{(x-7)(x+6)}{x^2 - 1x - 42}$

11.  $h(x) = 3f(x) - g(x)$   
 $3(-6x+9) - (x^2-1x-42)$   
 $-18x+27 - x^2+1x+42$   
 $-17x+69 - x^2$   
 or  $-x^2 - 17x + 69$

12.  $h(x) = f(x) \cdot f(x)$   
 $(-6x+9)(-6x+9)$   

-6x	+9		
-6x	+9	$36x^2$	$-54x$
+9	+9	$-54x$	$81$

 $36x^2 - 54x - 54x + 81$   
 $36x^2 - 108x + 81$

13.  $h(x) = f(x) \cdot g(x)$   
 $(-6x+9)(x^2-x-42)$   

	-6x	9		
$x^2$	$-6x^3$	$9x^2$		
-x	$6x^2$	$-9x$		
-42	$252x$	$-378$		

 $-6x^3 + 9x^2 + 6x^2 - 9x + 252x - 378$   
 $-6x^3 + 15x^2 + 243x - 378$

14.  $h(x) = \frac{f(x)}{g(x)}$  State the domain.  

$-6x+9$
$(x-7)(x+6)$

 Domain  
 $x-7 \neq 0$   $x+6 \neq 0$   

$x \neq 7$	$x \neq -6$
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Find the value of each expression, given the following equations. Show your work!  
 $f(x) = 4x + 3$ ,  $g(x) = 3x^2 + x - 7$

Let  $x = 1$

15.  $2f(1) \cdot g(3)$   
 $2[4x+3] \cdot 3x^2+x-7$   
 $2[4(1)+3] \cdot 3(3)^2+3-7$   
 $2[7] \cdot 23$   
 $14 \cdot 23$   
322

16.  $f(-2) + g(-1)$   
 $4x+3 + 3x^2+x-7$   
 $4(-2)+3 + 3(-1)^2+(-1)-7$   
 $-5 + -5$   
-10

Simplify the following:

17.  $\sqrt{-81}$

$$\sqrt{-1} \cdot \sqrt{81}$$

$$i \cdot 9$$

$$\boxed{9i}$$

18.  $-\sqrt{3} \cdot \sqrt{-20}$

$$-\sqrt{3} \cdot \sqrt{20} \cdot \sqrt{-1}$$

$$-2\sqrt{15}i$$

OR

$$-2i\sqrt{15}$$

yellow calculator

19.  $-3\sqrt{-45}$

yellow calculator

$$-3\sqrt{45} \cdot \sqrt{-1}$$

yellow calc

$$-9\sqrt{5}i$$

OR

$$-9i\sqrt{5}$$

20.  $\sqrt{-120}$

$$\sqrt{120} \cdot \sqrt{-1}$$

$$2\sqrt{30}i$$

$$2i\sqrt{30}$$

21.  $-12i \cdot 11i$

use calculator (graphing)

$$-12 \cdot 11 \cdot \underbrace{i \cdot i}_{-1}$$

$$-132 \cdot -1$$

$$\boxed{132}$$

22.  $(5+2i)+(3+7i)$

$$5+2i+3+7i$$

$$5+3+2i+7i$$

$$\boxed{8+9i}$$

23.  $(6-4i) - (-4+i)$

$$6-4i+4-i$$

$$6+4-4i-i$$

$$\boxed{10-5i}$$

24.  $3i(12-8i)$

$$3i(12) \quad 3i(-8i)$$

$$36i \quad -24i^2$$

$$36i \quad -24(-1)$$

$$36i+24$$

$$\boxed{24+36i}$$

25.  $(4-7i)(-3+9i)$

	4	-7i
-3	-12	21i
9i	36i	-63i <sup>2</sup>

$$51 + 57i$$

$$\begin{aligned}
 & -12 + 21i + 36i - 63i^2 \\
 & -12 + 57i - 63(-1) \\
 & -12 + 57i + 63 \\
 & -12 + 63 + 57i \\
 & 51 + 57i
 \end{aligned}$$

26.  $(-7-2i)^2$

$(-7-2i)(-7-2i)$

	-7	-2i
-7	49	14i
-2i	14i	4i <sup>2</sup>

$$45 + 28i$$

$$\begin{aligned}
 & 49 + 14i + 14i + 4i^2 \\
 & 49 + 28i + 4(-1) \\
 & 49 + 28i + -4 \\
 & 49 + -4 + 28i \\
 & 45 + 28i
 \end{aligned}$$