Name: Answer Key Date: _____

Intermediate Algebra Review for Exam 3

1) Add $(5x^2 + 2x - 10)$ and $(-6x^2 + 3x - 4)$

$(5x^2+2x-10)+(-6x^2+3x-4)$

$\boxed{-x^2+5x-14}$

2) Find the sum of $(3a + 6ab - 8b)$ and $(-2a + 10ab - 6b)$

add!

$(3a+6ab-8b)+(-2a+10ab-6b)$

$\boxed{a+16ab-14b}$

3) Subtract $(3x - 10)$ from $(7x^2 + x + 15)$

keep change change

$(7x^2+x+15)-(3x-10)$

$7x^2+x+15-3x+10 \rightarrow \boxed{7x^2-2x+25}$

4) Subtract: $(-9x^2 + 4x + 1) - (6x^2 - 5x + 10)$

$-9x^2+4x+1-6x^2+5x-10$

$\boxed{-15x^2+9x-9}$

5) Multiply $(x + 5)(x - 6)$

$x^2-6x+5x-30 \rightarrow \boxed{x^2-x-30}$

6) Multiply $(2x + 3)(3x - 5)$

$6x^2-10x+9x-15 \rightarrow \boxed{6x^2-x-15}$

7) Given $f(x) = \frac{2}{5}x^2 + 4$, evaluate $f(10)$.

$f(10) = \frac{2}{5}(10)^2+4 = \boxed{44}$

8) Solve and check: $2x - 5 + 7x = 11 - 3x + 4x$

$9x-5=11+x$

$-x \quad -x$

$8x-5=11$

$+5 \quad +5$

$8x=16$

$\frac{8x}{8}=\frac{16}{8}$

$x=2$

Check

$2x-5+7x=11-3x+4x$

$2(2)-5+7(2)=11-3(2)+4(2)$

$13=13\checkmark$

Check

$2(2)-5+7(2)=$

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9) Solve and check: $\frac{2}{3}(15-6a)=\frac{5}{6}(12a+18)$

$10-4a=10a+15$

$+4a \quad +4a$

$10=14a+15$

$-15 \quad -15$

$\frac{-5}{14}=\frac{14a}{14} \rightarrow \boxed{a=\frac{-5}{14}}$

Check

$\frac{2}{3}(15-6(\frac{-5}{14}))=\frac{5}{6}(12(\frac{-5}{14})+18)$

$\frac{80}{7}=\frac{80}{7}$ ✓

10) Solve for m: $3n-2m=5$

$-3n \quad -3n$

$\frac{-2m}{-2}=\frac{5-3n}{-2} \rightarrow \boxed{m=\frac{5-3n}{-2}}$

11) Solve for x: $2x+6y=18$

$-6y \quad -6y$

$\frac{2x}{2}=\frac{18-6y}{2}$

$\boxed{x=\frac{18-6y}{2} \text{ or } x=9-3y}$

12) Solve for a: $\frac{a-5}{b}=c$ ·b

$a-5=cb$

$+5 \quad +5$

$\boxed{a=cb+5}$

13) Solve the system of equations and check:

$2x-8y=4$

$-2x+5y=-1$

$-3y=3$

$\frac{-3y}{-3}=\frac{3}{-3}$

$y=-1$

$2x-8y=4$

$2x-8(-1)=4$

$2x+8=4$

$-8 \quad -8$

$\frac{2x}{2}=\frac{-4}{2}$

$x=-2$

$\boxed{(-2,-1)}$

Check

$2x-8y=4$

$2(-2)-8(-1)=4$

$4=4$ ✓

$-2x+5y=-1$

$-2(-2)+5(-1)=-1$

$-1=-1$

14) Solve the system of equations and check:

$6x+10y=-2$

$y=2x-8$

$6x+10(2x-8)=-2$

$6x+20x-80=-2$

$26x-80=-2$

$+80 \quad +80$

$\frac{26x}{26}=\frac{78}{26}$

$x=3$

$y=2x-8$

$y=2(3)-8$

$y=-2$

Check

$6x+10y=-2$

$6(3)+10(-2)=-2$

$-2=-2$ ✓

$y=2x-8$

$-2=2(3)-8$

$-2=-2$ ✓

$\boxed{(3,-2)}$

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15) Solve the system of equations and check $\begin{cases} -4x - 2y = 14 \\ -10x + 7y = -25 \end{cases}$

$40x + 20y = -140$
$-40x + 28y = -100$
$48y = -240$
$\frac{48y}{48} = \frac{-240}{48}$
$y = -5$

$-10(-4x - 2y = 14)$
$4(-10x + 7y = -25)$
$-4x - 2y = 14$
$-4x - 2(-5) = 14$
$-4x + 10 = 14$
$-10 \quad -10$
$\frac{-4x}{-4} = \frac{4}{-4} \rightarrow x = -1$

$(-1, -5)$

Check
$-4x - 2y = 14$
$-4(-1) - 2(-5) = 14$
$14 = 14$ ✓
$-10x + 7y = -25$
$-10(-1) + 7(-5) = -25$
$-25 = -25$ ✓

16) Solve and graph the solution. Write the solution in interval notation.
$5(x - 2) \geq 9x - 3(2x - 4)$

$5x - 10 \geq 9x - 6x + 12$
$5x - 10 \geq 3x + 12$
$2x - 10 \geq 12$
$+10 \quad +10$
$\frac{2x}{2} \geq \frac{22}{2}$
$x \geq 11$

$[11, \infty)$

17) Solve and graph the solution. Write the solution in set-builder notation.
$\frac{|2+3x|}{2} \geq 5$

$\{x \mid x \geq \frac{8}{3}, x \leq 3\}$

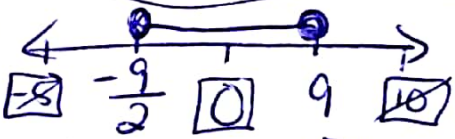
$(2)\frac{2+3x}{2} \geq 5(2)$
$-2 \quad -2$
$3x \geq 8$
$\frac{3x}{3} \geq \frac{8}{3} \rightarrow x \geq \frac{8}{3}$

$-\frac{(2+3x)}{2} \geq 5$
$-2 - 3x \geq 5(2)$
$-2 - 3x \geq 10$
$+2 \quad +2$
$\frac{-3x}{-3} \geq \frac{12}{-3}$
$x \leq -3$

18) Solve and graph the solution. Write the solution in interval notation.
$|4x - 9| \leq 27$

$4x - 9 \leq 27$
$+9 \quad +9$
$\frac{4x}{4} \leq \frac{36}{4}$
$x \leq 9$

$-(4x - 9) \leq 27$
$-4x + 9 \leq 27$
$-9 \quad -9$
$\frac{-4x}{-4} \leq \frac{18}{-4} \rightarrow x \geq \frac{9}{2}$



$[-9/2, 9]$

19) Given $f(x) = 2x - 1$ and $g(x) = 2x^2 - 3x$ find $g(f(x))$

$2(2x-1)^2 - 3(2x-1)$
$2(4x^2 - 2x - 2x + 1) - 3(2x - 1)$
$8x^2 - 8x + 2 - 6x + 3 \rightarrow 8x^2 - 14x + 5$

20) If $f(x) = x^2 - 1$ and $g(x) = 2x + 5$, find $f(g(x))$

$(2x+5)^2 - 1$
$(2x+5)(2x+5)$
$(4x^2 + 10x + 10x + 5) - 1$
$4x^2 + 20x + 5 - 1$
$4x^2 + 20x + 4$

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21) Given $f(x) = 3x - 2$ and $g(x) = x^2 - 3$ find $g(f((2))$

$f(2) = 3(2) - 2 = 4$

$g(4) = 4^2 - 3 = 13$

22) If $f(x) = 2x - 1$ and $h(x) = x^2 + 1$, find $h(f(-4))$

$f(-4) = 2(-4) - 1 = -9$

$h(-9) = (-9)^2 + 1 = 82$

23) Simplify: $(-3a^3 + 5a^2 + a - 13) - (4a^3 - 2a^2 + 6a - 2)$

$-3a^3 + 5a^2 + a - 13 \quad -4a^3 + 2a^2 - 6a + 2$

$-7a^3 + 7a^2 - 5a - 11$

24) Solve and graph the solution. Write the answer in interval notation. $|2x - 3| \geq 1$

$2x - 3 \geq 1$

$\frac{2x}{2} \geq \frac{4}{2}$

$x \geq 2$

$-(2x - 3) \geq 1$

$-2x + 3 \geq 1$

$-3 \quad -3$

$\frac{-2x}{-2} \geq \frac{-2}{-2}$

$x \leq 1$

$(-\infty, 1] \cup [2, \infty)$

$|2(0) - 3| \geq 1$

$3 \geq 1$ ✓

$|2(3) - 3| \geq 1$

$3 \geq 1$ ✓

$|2(1.5) - 3| \geq 1$

$0 \not\geq 1$

25) Solve and Check: $-2(1 - 7y) = 8(y - 7)$

$-2 + 14y = 8y - 56$

$-2 + 6y = -56$

$+2 \quad +2$

$6y = -54$

$y = -9$

26) Solve: $8x + 16x - 12 = 24x - 16 + 4$

$24x - 12 = 24x - 12$

Many Solutions!

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