Name Answer Key

Ms. Schmidt

Date _____

Intermediate Algebra

Final Review #8 – Mixed Review

1) Determine the solution set to the equation $x^2 - 9x + 14 = 0$.

factor

$(x^2-2x)(-7x+14)=0$ $\frac{14x^2}{2\cdot 7}$

$x(x-2)-7(x-2)$

$(x-7)(x-2)=0$

$x-7=0$ $x-2=0$

$x=7$ $x=2$

2) Solve for x: $5^{2x} = 5^{x-10}$

$2x = x-10$

$-x \quad -x$

$x = -10$

3) Solve for the roots of the equation by completing the square: $x^2 - 4x - 20 = 0$

$x^2-4x = 20$

$(x-2)^2 = 20+4$

$\sqrt{(x-2)^2} = \sqrt{24} < \frac{\sqrt{4}}{\sqrt{6}}$

$x-2 = \pm 2\sqrt{6}$

$+2 \quad +2$

$\boxed{x = 2 \pm 2\sqrt{6}}$

4) Solve for all values of x: $|2x - 11| = 3$

$2x-11=3$ $\quad -(2x-11)=3$

$+11 \quad +11$ $\quad -2x+11=3$

$\frac{2x}{2} = \frac{14}{2}$ $\quad -11 \quad -11$

$\boxed{x=7}$ $\quad \frac{-2x}{-2} = \frac{-8}{-2}$ $\quad \boxed{x=4}$

5) State the center and radius of the circle: $(x-5)^2 + (y+4)^2 = 81$

Center $(5, -4)$

radius $\sqrt{81} = 9$

6) Solve for x by using the quadratic formula: $9x^2 - 6x - 11 = 0$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$a = 9$

$b = -6$

$c = -11$

$x = \frac{-(-6) \pm \sqrt{(-6)^2-4(9)(-11)}}{2(9)}$

$x = \frac{6 \pm \sqrt{432}}{18}$ $\quad \sqrt{144}\cdot 12 < \sqrt{3}$

$x = \frac{6 \pm 12\sqrt{3}}{18_3}$ $\quad \boxed{x = \frac{1 \pm 2\sqrt{3}}{3}}$

7) Given $f(x) = x - 2$ and $g(x) = 8x$ find:

a. $g(f(3))$

$f(3) = 3 - 2 = 1$

$g(1) = 8(1) = \boxed{8}$

b. $g(f(x))$

$8(x-2)$

$\boxed{8x - 16}$

8) Simplify: $7\sqrt{5} - 2\sqrt{45} - \sqrt{20}$

$\sqrt{9}\sqrt{5}$ $\sqrt{4}\sqrt{5}$

$3\sqrt{5}$ $2\sqrt{5}$

$7\sqrt{5} - 6\sqrt{5} - 2\sqrt{5}$

$\boxed{-1\sqrt{5}}$

9) Find the product of $7y^3$ and $-2y^5$.

multiply! $-14y^8$

10) Find the domain of the function: $f(x) = \{(-5,2)(-4,1)(2,-3)\}$

x-values $\{-5, -4, 2\}$

11) Solve for x: to $3(5x + 4) - 20 = 12x - 4$

$15x + 12 - 20 = 12x - 4$

$15x - 8 = 12x - 4$

$-12x \quad -12x$

$3x - 8 = -4$

$+8 \quad +8$

$\frac{3x}{3} = \frac{4}{3}$

$\boxed{x = \frac{4}{3}}$

12) Solve for y: $\sqrt{y-4} + 1 = 9$

$-1 \quad -1$

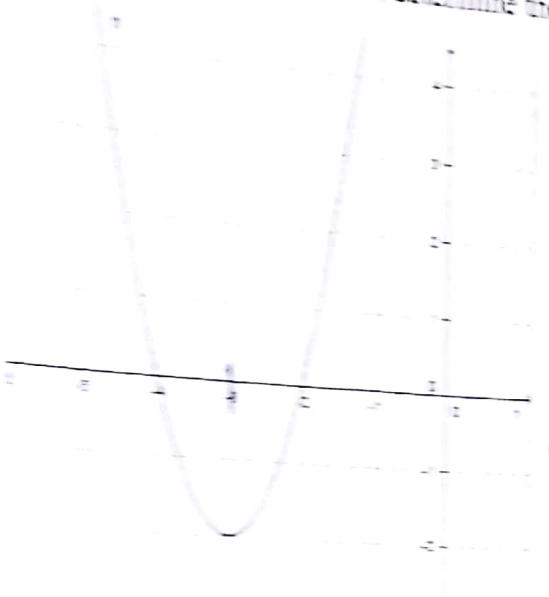
$(\sqrt{y-4})^2 = (8)^2$

$y - 4 = 64$

$+4 \quad +4$

$\boxed{y = 68}$

13) Using the graph below, determine the following:



A) The axis of symmetry

$x = -3$

B) State the minimum point

$(-3, -2)$

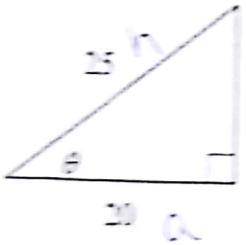
C) The roots of the equation

$x = -4 \quad x = -2$

or

$(-4, 0) \quad (-2, 0)$

14) Find $\sin\theta$



$\sin = \frac{O}{h} = \frac{15}{25} = \boxed{\frac{3}{5}}$

15) Line segment AB has endpoints $(-3, 1)$ and $(-7, -2)$. find the slope, midpoint and distance of this line.

a) Slope $\frac{y_2 - y_1}{x_2 - x_1} \quad \frac{-2-1}{-7+3} = \frac{-3}{-4} = \boxed{\frac{3}{4}}$

b) Midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) \quad \left(\frac{-3+-7}{2}, \frac{1+-2}{2}\right) \rightarrow \boxed{\left(-5, \frac{-1}{2}\right)}$

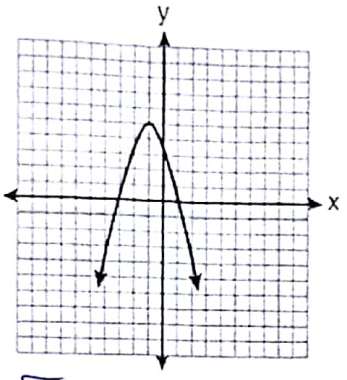
c) Distance $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$\sqrt{(-7+3)^2+(-2-1)^2} = \sqrt{(-4)^2+(-3)^2}$

$= \sqrt{16+9} = \sqrt{25} = \boxed{5}$

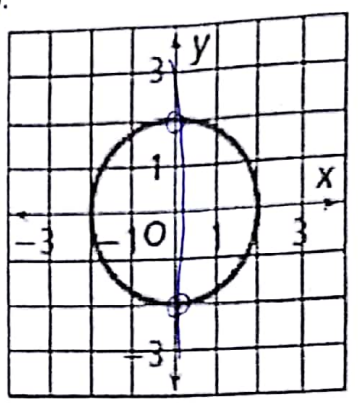
16) Determine if the following are functions or not:

a.



Function

b.



Not a function

17) Find the inverse function of $f(x) = 3x - 10$ and solve for $f^{-1}(x)$ in terms of x.

Switch x and y

$x = 3y - 10$

$+10 \quad +10$

$\frac{x+10}{3} = \frac{3y}{3}$

$\boxed{\frac{x+10}{3} = f^{-1}(x)}$

18) Factor each of the following completely:

a. $\frac{3x^3 + 36x^2 + 96x}{3x}$

$3x(x^2 + 12x + 32)$

$(x^2+4x)(8x+32)$

$x(x+4)\ 8(x+4)$

$\boxed{3x(x+8)(x+4)}$

32

$4 \cdot 8$

b. $(x^2y - x)(-2yx^2 + 2x)$

$x(xy-1) - 2x(yx-1)$

$\boxed{(x-2x)(yx-1)}$

19) Given the following functions:

$f(x) = 2x^2 - 3x + 4 \qquad g(x) = 4x^2 + 1 \qquad h(x) = x^2 - 5$

Find:

a. $f(x) + h(x)$

$2x^2 - 3x + 4 + x^2 - 5$

$\boxed{3x^2 - 3x - 1}$

1st

b. $g(x) \cdot h(x)$

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

$4x^4 - 20x^2 + x^2 - 5$

$\boxed{4x^4 - 19x^2 - 5}$

c. Subtract $f(x)$ from $g(x)$

$(4x^2+1) - (2x^2 - 3x + 4)$

$4x^2 + 1 - 2x^2 + 3x - 4$

$\boxed{2x^2 + 3x - 3}$

d. $h(x) - g(x)$

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

$x^2 - 5 - 4x^2 - 1$

$\boxed{-3x^2 - 6}$