MATH 1200 - EXAM 2A   *Solutions*   Spring 2014

Name: _____

Show ALL of your work for full credit. Simplify your answers as much as possible. Each problem (as well as each part) is worth 6 points unless otherwise specified.

1. Find the distance between the points $A(1,2)$ and $B(5,-3)$. Using $d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$d=$distance from A to B is

$d=\sqrt{(5-1)^2+(-3-2)^2}$
$=\sqrt{16+25}=\sqrt{41}$

2. Find the midpoint of the line segment with endpoints $A(1,2)$ and $B(5,-3)$. Using $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

Midpoint $=\left(\frac{5+1}{2}, \frac{-3+2}{2}\right)$
$=\left(3, -\frac{1}{2}\right)$

3. Solve $x^2+10x-2=0$ by completing the square.

$x^2+10x=2$
$x^2+10x+(5)^2=2+(5)^2$
$(x+5)^2=27$
$x+5=\pm\sqrt{27}$
$x=-5\pm\sqrt{27}$

$\sqrt{27}=\sqrt{9}\cdot\sqrt{3}$
$=3\sqrt{3}$

4. Use the Pythagorean Theorem to find the possible values for x. Circle the correct value.
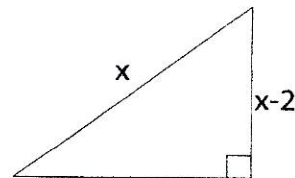Height^2 + Base^2 = Hypotenuse^2

$(x-2)^2+(x-1)^2=x^2$
$(x^2-4x+4)+(x^2-2x+1)=x^2$
$2x^2-6x+5=x^2$
$x^2-6x+5=0$
$(x-5)(x-1)=0$
$x=5$ or $x=1$

$x=1$, makes height not possible $=1-2=-1$
So $x=5$ is the only solution

(triangle with sides x (hypotenuse), $x-2$, and $x-1$)

5. Solve each inequality. Write your answers using interval notation.

A. $-3(x+4)+2>x+6$
$-3x-12+2>x+6$
$-3x-10>x+6$
$-4x>16$
$x<-4$

B. $-4\le\dfrac{3x+4}{2}\le2$
$-8\le 3x+4\le4$
$-12\le 3x\le0$
$-4\le x\le0$

C. $|2x+3|<-2$
$|2x+3|$ Cannot be negative, So no solution

6. Write the standard form of the circle with center $(2,-1)$ and radius 3. Clearly sketch the circle.

Using $(x-h)^2+(y-k)^2=r^2$ Center (h,k) and radius 'r'
$(x-2)^2+(y-(-1))^2=3^2$
$(x-2)^2+(y+1)^2=9$

7. Solve each equation.

A. $6x^2 = 24x$

$$x^2 = 4x$$
$$x^2 - 4x = 0$$
$$x(x-4) = 0$$
$$x = 0 \text{ or } x = 4$$

B. $\sqrt{3x-7} - \sqrt{4-x} = 0$

$$\sqrt{3x-7} = \sqrt{4-x}$$
$$(\sqrt{3x-7})^2 = (\sqrt{4-x})^2$$
$$3x - 7 = 4 - x$$
$$4x = 11$$
$$x = \frac{11}{4}$$

C. $\dfrac{3}{x-2} - \dfrac{3}{x^2+3x-10} = 0$

$$\frac{3}{x-2} = \frac{3}{x^2+3x-10}$$
$$\frac{1}{(x-2)} = \frac{1}{(x+5)(x-2)} \qquad x \neq 5 \text{ and } x \neq 2$$
$$\frac{1}{1} = \frac{1}{(x+5)}$$
$$x + 5 = 1$$
$$x = -4$$

D. $2|2x-3| + 4 = 10$

8. Evaluate $f(x) = x^2 + 4$ for the given values of x. Simplify as much as possible.

A. $f(0)$ [4 pts.]

$$f(0) = 0 + 4 = 4$$

B. $f(-2)$

$$f(-2) = (-2)^2 + 4$$
$$= 4 + 4$$
$$= 8$$

C. $f\left(\frac{1}{2}\right)$

$$f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 + 4$$
$$= \frac{1}{4} + 4$$
$$= 4\frac{1}{4}$$
$$= \frac{17}{4}$$

9. Consider the following graph. [6 pts. total]

A. Does this graph represent a function? Explain your reasoning.
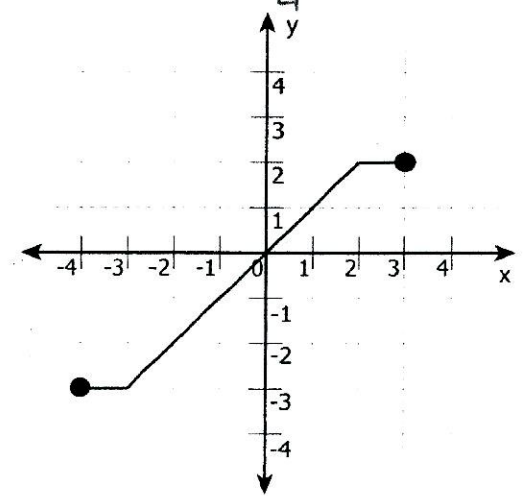
Yes because this graph satisfies the vertical line test.

B. State the domain. Write your answer in interval notation.

$$[-4, 3]$$

C. State the range. Write your answer in interval notation.

$$[-3, 2]$$

10. Find the x and y intercepts of $2x + 7y = 28$.

$$2x + 7y = 28$$
x-intercept $(y=0)$
$$2x = 28$$
$$x = 14$$
So, x-intercept is $(14, 0)$

$$2x + 7y = 28$$
y-intercept $(x=0)$
$$0 + 7y = 28$$
$$y = 4$$
y-intercept is $(0, 4)$