Math 1200 Fall 2017 (Exam 2A) Name: Key

Show all your work to get full/ partial credit. Each problem is worth 5 points.

1) Identify the following equation as conditional, contradiction, or identity.

$$4(3-5x)+1=-4x-8-16x$$

$$12-20x+1=-4x-8-16x$$

$$-20x+13=-20x-8$$

$$13=-8$$

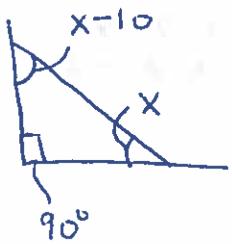
contradiction

2) Solve for x: $8=4x+ax$

$$8=x(4+a)$$

$$\frac{8}{4+a}=x$$

3) A ladder leans against a wall. The angle between the ladder and the wall is 10° less than the angle that the ladder makes with the ground. Find the measure of each angle.



x = angle ladder makes with ground

$$90+x+(x-10)=180$$

$$2x+80=180$$

$$2x=100$$

$$x=50$$

Angle with ground: 50°
Angle with wall: 40°
Angle ~~with~~ of ground & wall: 90°

4) Perform the indicated operation $(2+3i)(3+2i)$. Write the answer in standard form $a+bi$.

$$=6+4i+9i+6i^2$$

$$=6+13i+6i^2$$

$$=6+13i+6(-1)$$

$$=0+13i$$

5) Solve $2x^2-7x-4=0$ using the quadratic formula. Explicitly state the discriminant.

Discriminant: $\sqrt{(-7)^2-4(2)(-4)}$

$$=\sqrt{49+32}$$

$$=\sqrt{81}$$

$$=9$$

$$x=\frac{-(-7)\pm 9}{2(2)}$$

$$=\frac{7\pm 9}{4}$$

So $x=\frac{16}{4}=4$ & $x=\frac{-2}{4}=-\frac{1}{2}$

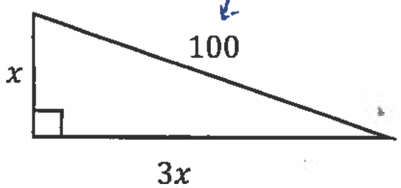
6) Solve $t^2 - 6t = 10$ by completing the square.

$$n = \left(\frac{-6}{2}\right)^2 = (-3)^2 = 9$$

$$t^2 - 6t + 9 = 10 + 9$$
$$(t-3)^2 = 19$$
$$t - 3 = \pm\sqrt{19}$$
$$t = 3 \pm \sqrt{19}$$

7) Write an equation that relates the lengths of the sides of the given right triangle. Do not solve.

hypotenuse



Pythagorean Thm

$$x^2 + (3x)^2 = 100^2$$
$$x^2 + 9x^2 = 100^2$$

8) Solve the equation: $\frac{3x}{x+2} - \frac{5}{x-4} = \frac{2x^2-14x}{x^2-2x-8}$

$$\frac{3x}{x+2} - \frac{5}{x-4} = \frac{2x(x-7)}{(x-4)(x+2)}$$

LCD: $(x-4)(x+2)$

Restrictions: $x \neq 4$
$x \neq -2$

$$\frac{(x-4)(x+2)}{1}\left(\frac{3x}{x+2} - \frac{5}{x-4}\right) = \left(\frac{2x(x-7)}{(x-4)(x+2)}\right)\left(\frac{(x-4)(x+2)}{1}\right)$$

$$3x(x-4) - 5(x+2) = 2x(x-7)$$
$$3x^2 - 12x - 5x - 10 = 2x^2 - 14x$$
$$x^2 - 3x - 10 = 0 \Rightarrow (x-5)(x+2) = 0$$

$\boxed{x = 5}$ and $\cancel{x = -2}$

Disregard b/c of restriction

9) State the restricted values of x from the equation given in #8

$x \neq 4 \quad x \neq -2$

10) Solve the equation: $\sqrt{2x+1} - 1 = 4$

$$(\sqrt{2x+1})^2 = (5)^2$$
$$2x + 1 = 25$$
$$2x = 24$$
$$x = 12$$

Given $A = \{-8, -1, 4, 7, 13\}$ and $B = \{-1, 10, 13\}$, find

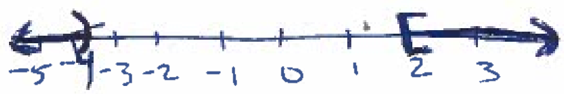
11) $A \cup B = \{-8, -1, 4, 7, 13, 10\}$ $A \cap B = \{-1, 13\}$

12) Solve the following compound inequality:

$\frac{1}{4}y < -1$ or $3 + y \geq 5$

$y < -4$ or $y \geq 2$

13) Graph the solution from #12 on a number line:



14) Solve $|2a - 3| = |a + 2|$

$2a - 3 = a + 2$ or $2a - 3 = -(a + 2)$

$a = 5$

$2a - 3 = -a - 2$

$3a = 1$

$a = 1/3$

15) Solve $|x + 2| < -4$

No sol.

16) Determine the x- and y-intercepts of the following equation:

$$-3x - 5y = 60$$

x-intercept(s)

$-3x - 5(0) = 60$

$-3x = 60$

$x = -20$

$(-20, 0)$

y-intercept(s)

$-3(0) - 5y = 60$

$-5y = 60$

$y = -12$

$(0, -12)$

17) Find the distance between $points\ A(2,4)$ and B(6,1)

$$d = \sqrt{(6-2)^2 + (1-4)^2}$$
$$= \sqrt{4^2 + (-3)^2}$$
$$= \sqrt{16+9}$$
$$= \sqrt{25} = 5$$

18) Find the midpoint between $points\ A(2,4)$ and $B(6,1)$

$$\text{midpt} = \left(\frac{2+6}{2}, \frac{4+1}{2}\right) = \left(\frac{8}{2}, \frac{5}{2}\right) = \left(4, \frac{5}{2}\right)$$

19) Write the equation of the circle in standard form with the center (3,4) and $r = 5$.

$$(x-3)^2 + (y-4)^2 = 5^2$$
$$(x-3)^2 + (y-4)^2 = 25$$

20) Write the equation of the circle in standard form. Identify the center and radius of the circle

$x^2 + y^2 - 2x - 8 = 0$

$$x^2 - 2x + y^2 = 8 \qquad n = \left(\frac{-2}{2}\right)^2 = 1$$
$$x^2 - 2x + 1 + y^2 = 8 + 1$$
$$(x-1)^2 + (y-0)^2 = 9 = 3^2$$

center: (1, 0)

radius: 3