Math 1200 Exam 2A   Fall 2016   Name___________

Show all your work to get full/partial credits. Each question is worth 5 points.

1. Determine the value of n that makes the polynomial $u^2 - 4u + n$ a perfect square trinomial.

$n = \left(\frac{-4}{2}\right)^2 = (-2)^2 = 4$

$\boxed{n = 4}$

Solve:

2. $5x^2 - 2x + 3 = 0$

$a = 5,\ b = -2,\ c = 3$

$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(5)(3)}}{2(5)}$

$= \frac{2 \pm \sqrt{4-60}}{10}$

$x = \frac{2 \pm \sqrt{-56}}{10}$

3. $\sqrt{x+2} = x+2$

$(\sqrt{x+2})^2 = (x+2)^2$

$x+2 = x^2 + 4x + 4$

$x^2 + 3x + 2 = 0$

$(x+1)(x+2) = 0$

$x = -1$ or $x = -2$

solution set $\{-1, -2\}$.

Verifying your solution

$x = -1$

$\sqrt{-1+2} = -1+2$

$\sqrt{1} = 1$

$1 = 1$ ✓

$x = -2$

$\sqrt{-2+2} = -2+2$

$\sqrt{0} = 0$

$0 = 0$ ✓

4. $|2y - 3| = |y + 2|$

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

$2y - y = 2 + 3$ or $2y + y = -2 + 3$

$y = 5$ or $3y = 1$

$y = 1/3$

$\Rightarrow y = 5$ or $1/3$

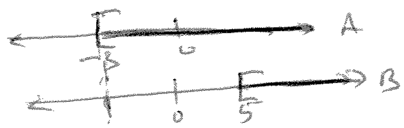
5. Write an equation representing the fact that the sum of squares of two consecutive integers is 113.

Let x, $x+1$, represent the consecutive numbers.

$\Rightarrow x^2 + (x+1)^2 = 113$

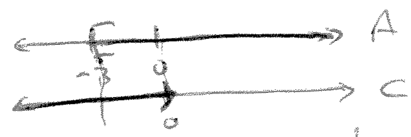
For sets $A = \{ y \mid y \geq -3 \}$, $B = \{ y \mid y \geq 5 \}$, $C = \{ y \mid y < 0 \}, find$

6. $A \cup B$



$\Rightarrow A \cup B = \{ y \mid y \geq -3 \} = A$

7. $A \cap C$



$A \cap C = \{ y \mid -3 \leq y < 0 \}$.

8. Solve $-2 \leq \frac{4x-1}{3} \leq 5$

$-6 \leq 4x-1 \leq 15$

$-6+1 \leq 4x \leq 15+1$

$-5 \leq 4x \leq 16$

$\frac{-5}{4} \leq x \leq \frac{16}{4}$

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

9. Graph the solution set in # 8.

$\{ x \mid -5/4 \leq x \leq 4 \}$

10. Solve $-11 \leq 5 - |2x+4|$, and write the solution set in interval notation.

$-11-5 \leq -|2x+4|$

$-16 \leq -|2x+4|$

$|2x+4| \leq 16$

$-16 \leq 2x+4 \leq 16$

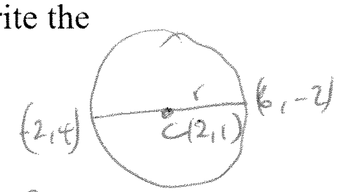
$-20 \leq 2x \leq 12$

$-10 \leq x \leq 6$

solution set

$[-10, 6]$

11. The end points of the diameter of a circle are $(-2,4)$ and $(6,-2)$. Write the equation of the circle in standard form.



$c = \left(\frac{6-2}{2}, \frac{-2+4}{2}\right) = \left(\frac{4}{2}, \frac{2}{2}\right) = (2,1)$

$r = \sqrt{(6-2)^2 + (1+2)^2}$

$r = \sqrt{4^2+3^2} = \sqrt{25} = 5$

$\Rightarrow (x-h)^2 + (y-k)^2 = r^2$

$(x-2)^2 + (y-1)^2 = 5^2$

$(x-2)^2 + (y-1)^2 = 25$

12. For $y = x^2 - 8$, find the $x-$ and $y-$ intercepts.

x-intercept, $y=0$

$0 = x^2 - 8$

$x^2 = 8$

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

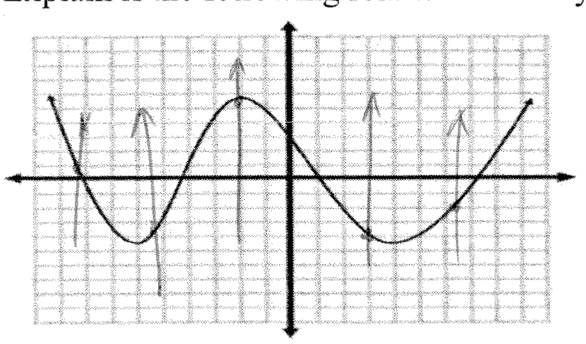
$(2\sqrt{2}, 0), (-2\sqrt{2}, 0)$

for y-intercept, $x = 0$

$y = -8$

$(0, -8)$

13. Explain if the following relation defines y as a function of x.



~~y define~~

y is a function of x because the graph passes the vertical line test.

Refer to #s 14 -15, $f(x) = \frac{x-3}{x^2-16}$, find

14. Restrictions on f, if any.

$x^2-16 = (x-4)(x+4)$

$\Rightarrow x \neq -4,\ x \neq 4$

15. The domain of f.

Domain : $(-\infty, -4) \cup (-4, 4) \cup (4, \infty)$

Refer to #s 16 -18, $f(x) = \sqrt{x+1}$, find

16. $f(A)$

$= \sqrt{A+1}$

17. $f(24)$

$= \sqrt{24+1}$

$= \sqrt{25} = 5$

18. The domain of f.

$x+1 \geq 0$

$x \geq -1$

Domain : $\{x : x \geq -1\}$ or $[-1, \infty)$

19. Write the equation of the line passing through points $A(4, -7)$ and $B(2, -1)$.

$m = \frac{Y_2 - Y_1}{x_2 - x_1} = \frac{-1-(-7)}{2-4} = \frac{6}{-2} = -3$,

$Y - Y_1 = m(x - x_1)$, using $(4, -7)$

$Y + 7 = -3(x - 4)$

$Y = -3x + 12 - 7$

$Y = -3x + 5$

20. Write the equation of the line passing through the point (6, 8) and perpendicular to the line 2y + 5x = 10.

$2y + 5x = 10$

$2y = -5x + 10$

$y = -\frac{5}{2}x + \frac{10}{2}$

$m_1 = -5/2$.

slope of new is given by $2/5$

since $\frac{2}{5} \cdot \frac{-5}{2} = -1$

$\Rightarrow Y - Y_1 = m(x - x_1)$

$Y - 8 = \frac{2}{5}(x-6)$

$Y - 8 = \frac{2x}{5} - \frac{12}{5}$

$Y = \frac{2x}{5} - \frac{12}{5} + 8$

$Y = \frac{2x}{5} + \frac{28}{5}$