Math 1111
1.1- 1.5, 1.7, 1.8

Sample Test 1

Name _____
Date _____

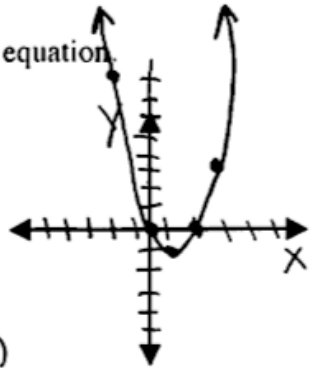
Version A

Directions: To receive partial credit you must show your work on a problem.
Circle final answers. All problems are 5 points each.

Graph the following equation.

1. $y = x^2 - 2x$

x	y	
2	0	$(2)^2-2(2)$
0	0	$(0)^2-2(0)$
-2	8	$(-2)^2-2(-2)$
3	3	$(3)^2-2(3)$
1	-1	$(1)^2-2(1)$



Quadratic
Parabola

Find the x- and y- intercepts.

2. $y = (x+2)^2$

x int ($y=0$)

$0 = (x+2)^2$

$\sqrt{0} = \sqrt{(x+2)^2}$

$0 = x+2$

$x+2 = 0$

$x = -2$

$(-2, 0)$

y int ($x=0$)

$y = (0+2)^2$

$y = 4$

$(0, 4)$

Test for symmetry with respect to the x-axis, y-axis, and origin.

3. $y = x^4 - x^2 + 3$ (org)

x axis ($y \to -y$)

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

org ≠ new

NO

y-axis ($x \to -x$)

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

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

org = new

YES

origin ($x \to -x$, $y \to -y$)

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

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

org ≠ new

NO

Determine if $x = -3$ is a solution to the following equation.

PEMDAS

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

$3(-3)^2 + 2(-3) - 5 = 2(-3)^2 - 2$

$27 - 6 - 5 = 18 - 2$

$16 = 16$ ✓

YES

Solve the equation.

5. $3(x+3) = 5(1-x) - 1$

$3x+9 = 5-5x-1$

$3x+9 = -5x+4$

$+5x \quad +5x$

$8x+9 = 4$

$-9 \quad -9$

$\frac{8x}{8} = \frac{-5}{8}$ $\boxed{x = \frac{-5}{8}}$

Solve the equation.

6. $\frac{x}{5} - \frac{x}{2} = \frac{3}{1} + \frac{3x}{10}$ LCD = 10

$2(10)\frac{x}{5} - 5(10)\frac{x}{2} = 1(10)\frac{3}{1} + \frac{3x}{10}$

$2x - 5x = 30 + 3x$

$-3x = 30 + 3x$

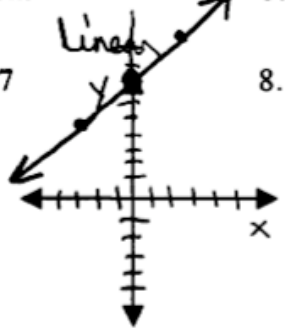
$-3x \quad -3x$

$\frac{-6x}{-6} = \frac{30}{-6}$ $\boxed{x = -5}$

Graph the equation.

7. $y = \frac{2}{3}x + 7$

x	y	
3	9	$\frac{2}{3}(3)+7$
0	7	$\frac{2}{3}(0)+7$
-3	5	$\frac{2}{3}(-3)+7$



Translate the verbal phrase.

8. The sum of two consecutive even integers.

Let x = 1st CEI (Smaller)

$x+2$ = 2nd CEI (larger)

$\boxed{(x)+(x+2)}$

Solve for r.

9. $A = P + Prt$

$-P \quad -P$

$\frac{A-P}{Pt} = \frac{Prt}{Pt}$

$\frac{A-P}{Pt} = r$

$\boxed{r = \frac{A-P}{Pt}}$

10. The length of a rectangular label is 3 cm less than twice the width. The perimeter is 54 cm. Find the width. ($P = 2L + 2W$) **(Setup an equation and solve it)**

Let x = width

$2x-3$ = length

$54 = 2(2x-3) + 2(x)$

$54 = 4x-6+2x$

$54 = 6x-6$

$60 = 6x$

$\boxed{x = 10}$ width

Solve by any method.

11. $\sqrt{(4x+7)^2} = \sqrt{44}$

$4x+7 = \pm\sqrt{44}$

$4x+7 = \pm\sqrt{4}\sqrt{11}$

$4x+7 = \pm 2\sqrt{11}$

$-7 \quad -7$

$\frac{4x}{4} = \frac{-7 \pm 2\sqrt{11}}{4}$

$x = \frac{-7}{4} \pm \frac{2\sqrt{11}}{4}$

$\boxed{x = \frac{-7}{4} \pm \frac{\sqrt{11}}{2}}$

$x^2 = k$

$\sqrt{x^2} = \sqrt{k}$

$x = \pm\sqrt{k}$

$\left(\frac{8}{2}\right)^2 = 4^2$

$= 16$

$x^2+8x+14 = 0$

$x^2+8x = -14$

$x^2+8x+16 = -14+16$

$(x+4)(x+4) = 2$

$\sqrt{(x+4)^2} = \sqrt{2}$

$x+4 = \pm\sqrt{2}$

$\boxed{x = -4 \pm \sqrt{2}}$

Solve by any method.

12. $x^2+8x+14 = 0$

~~$(x \quad)(x \quad) = 0$~~

$a = 1$

$b = 8$

$c = 14$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ 64-56

$x = \frac{-(8) \pm \sqrt{(8)^2-4(1)(14)}}{2(1)}$

$x = \frac{-8 \pm \sqrt{8}}{2}$

$x = \frac{-8 \pm 2\sqrt{2}}{2}$

$x = \frac{-8}{2} \pm \frac{2\sqrt{2}}{2}$

$\boxed{x = -4 \pm \sqrt{2}}$

Perform the operation. Write the result in standard form of a complex number.

13. $(8+\sqrt{-18})-(4+3i\sqrt{2})$

$= (8+i\sqrt{18})-(4+3i\sqrt{2})$

$= 8+3i\sqrt{2}-4-3i\sqrt{2}$

$= \boxed{4}$

14. $\sqrt{-6}\cdot\sqrt{-2}$

$= i\sqrt{6}\cdot i\sqrt{2}$

$= i^2\sqrt{12} = -1\cdot 2\sqrt{3} = \boxed{-2\sqrt{3}}$

Perform the operation. Write the result in standard form of a complex number.

15. $(1-2i)^2-(1+2i)^2$

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

$= 1-2i-2i+4i^2-(1+2i+2i+4i^2)$

$= 1-4i-4-(1+4i-4)$

$= -3-4i-(-3+4i)$

$= -3-4i+3-4i$

$= \boxed{-8i}$

16. $\frac{6-7i}{1-2i}\cdot\frac{1+2i}{1+2i}$

$= \frac{6+12i-7i-14i^2}{1+2i-2i-4i^2}$

$= \frac{6+5i+14}{1+4} = \frac{20+5i}{5}$

$= \frac{20}{5}+\frac{5}{5}i = \boxed{4+i}$

Divide.

17. $\frac{-14}{2i} \cdot \frac{-2i}{-2i}$ $\quad 0+2i$ conjugate $= 0-2i$

$= \frac{+28i}{-4i^2} = \frac{28i}{4} = \boxed{7i}$

Solve the equation.

18. $2x^2 = 19x + 33$

$2x^2 - 19x - 33 = 0$

$(2x+3)(x-11) = 0$

$2x+3=0 \quad | \quad x-11=0$

$\boxed{x = -\frac{3}{2}} \quad | \quad \boxed{x = 11}$

Solve the following inequality. Write the solution set in interval notation. (#19, 20, 21)

19. (7) (8) (7) (1) LCD = 7

$\frac{3}{1} + \frac{2}{x} x > \frac{x}{1} - \frac{2}{1}$

$21 + 2x > 7x - 14$

$21 - 5x > -14$

$-21 \qquad -21$

$\frac{-5x}{-5} > \frac{-35}{-5}$

$x < 7$

$\boxed{(-\infty, 7)}$

20. $\left|1 - \frac{2x}{3}\right| < 1$ $\quad |x| < a$ $\quad -a < x < a$

$3 \cdot -\frac{1}{1} < 3 \cdot \frac{1}{1} - \frac{2x}{3} \cdot 3 < 1 \cdot 1$

$-3 < 3 - 2x < 3$

$-3 \quad -3 \quad -3$

$\frac{-6}{-2} < \frac{-2x}{-2} < \frac{0}{-2}$

$3 < x < 0$

$3 > x > 0$

$0 < x < 3$

$\boxed{(0, 3)}$

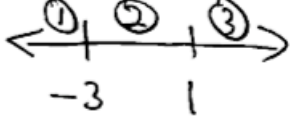
21. $x^2 + 2x \le 3$

$\boxed{x^2 + 2x - 3 \le 0}$

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

$(x+3)(x-1) = 0$

$x = -3 \quad x = 1$



test pts

$x = -4$ $\quad (-4)^2 + 2(-4) - 3 \le 0?$

$16 - 8 - 3 \le 0?$

$5 \le 0$ no

$x = 0$ $\quad 0^2 + 2(0) - 3 \le 0?$

$-3 \le 0$ yes

$x = 2$ $\quad (2)^2 + 2(2) - 3 \le 0?$

$5 \le 0$ no

$\boxed{[-3, 1]}$