Name_____ Date _____

1. Factor completely:
$x^2 + 10x + 24$
$(x+6)(x+4)$

2. Factor completely:
$3x^2 - 15x - 72$
$3(x^2-5x-24)$
$3(x-8)(x+3)$

3. Factor completely:
$x^2 + 16$
$(x+4i)(x-4i)$

4. Factor completely:
$16x^2 - 81$
$(4x-9)(4x+9)$

5. Factor completely:
$2x^2 + 7x + 3$
$(2x+1)(x+3)$

6. Factor completely:
$x^3 + 4x^2 + 8x + 32$
$(x^2+8)(x+4)$

7. Factor completely:
$5x^3 - 15x^2$
$5x^2(x-3)$

8. Factor completely:
$x^3 - 5x^2 - 4x + 20$
$(x^2-4)(x-5)$
$(x-2)(x+2)(x-5)$

9. Factor completely:
$x^2 + 121$
$(x+11i)(x-11i)$

10. Simplify completely:
$(12 + 14i) - (17 + 8i)$
$-5+6i$

11. Simplify completely:
$(3 - 2i)(4 + 5i)$
$12+15i-8i-10i^2$
$+10$
$22+7i$

12. Simplify completely:
$(2 + 5i)^2$
$(2+5i)(2+5i)$
$4+10i+10i+25i^2$
-25
$-21+20i$

13. Simplify completely:
$\frac{-5+2i}{6-3i} \cdot \frac{6+3i}{6+3i}$
$-30-15i+12i+6i^2$
$36-9i^2$
$\frac{-36-3i}{45}$
$\frac{-12-i}{15}$ or $-\frac{4}{5}-\frac{i}{15}$

14. Simplify completely:
$-\frac{5}{2i} \cdot \frac{2i}{2i}$
$\frac{-10i}{4i^2} = \frac{-10i}{-4} = \frac{5i}{2}$

Name_____ Date _____

15.

Domain $\mathbb{R}$ Range $[-4, \infty)$

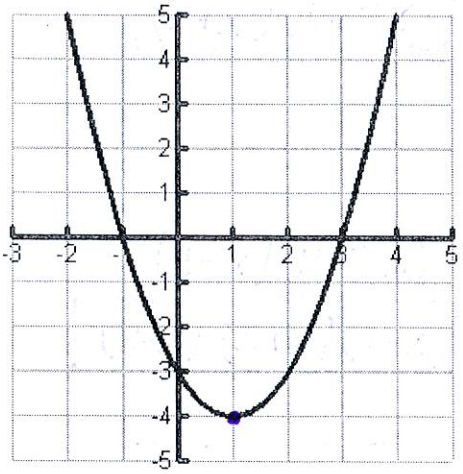
Extrema min @ $(1, -4)$ AOS $x = 1$

Inc. $(1, \infty)$ Dec $(-\infty, 1)$

Y – Int $(0, -3)$ X - ints $(-1, 0)$ $(3, 0)$

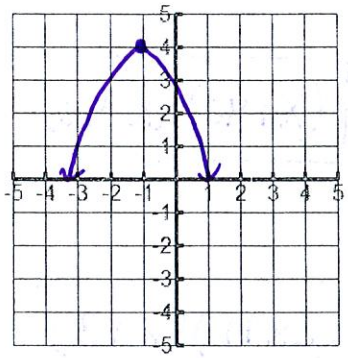
End Behavior $x \to -\infty$ $f(x) \to \infty$

$x \to +\infty$ $f(x) \to \infty$

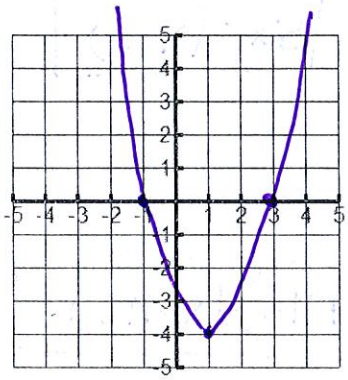


16. Sketch a graph with the following characteristics:

Extrema (-1, 4)
Increasing $(-\infty, -1)$
Decreasing $(-1, \infty)$



Extrema (1, -4)
Roots at (-1, 0) (3, 0)



Into which group or groups does each number go?

	Natural	Whole	Integers	Rational	Irrational	Real	Imaginary	Complex
4/9				✓		✓		✓
8-3i								✓
12	✓	✓	✓	✓		✓		✓