

Algebra 2 Quiz #4 Part 1: Chapter 4.1-4.4 (2 points each)

1. Factor the polynomial completely:  $w^3 - 2w^2 + 7w - 14$

$$w^3 - 2w^2 + 7w - 14$$

$$= w^2(w - 2) + 7(w - 2)$$

$$= (w^2 + 7)(w - 2)$$

2. Find the product:  $(4x^2 + 3x - 7)(x - 1)$

(D)

$$4x^2(x - 1) + 3x(x - 1) - 7(x - 1)$$

$$= 4x^3 - 4x^2 + 3x^2 - 3x - 7x + 7 = 4x^3 - x^2 - 10x + 7$$

3. Find the sum:  $(-2x^6 - x^5 + 9x^2 + 9x) + (6x^5 + 7x^3 - 5x^2 + 2x + 7)$

(C)

$$-2x^6 - x^5 + 9x^2 + 9x + 6x^5 + 7x^3 - 5x^2 + 2x + 7$$

$$= -2x^6 + 5x^5 + 7x^3 + 4x^2 + 11x + 7$$

4. Use synthetic division to evaluate the function for the indicated value of  $x$ :  $f(x) = 4x^3 + 6x - 8$ ;  $x = 5$

$$\begin{array}{r|rrrr} 5 & 4 & 0 & 6 & -8 \\ & & 20 & 100 & 530 \\ \hline & 4 & 20 & 106 & 522 \end{array}$$

$$f(5) = 522$$

5. Use Pascal's Triangle to expand the binomial:  $(g - 4)^4$

$(g + (-4))^4$

$a = g$   
 $b = -4$

1				
1	1			
1	2	1		
1	3	3	1	
1	4	6	4	1

$$(1) a^4 + (4) a^3 b + (6) a^2 b^2 + (4) a b^3 + (1) b^4$$

$$(1) g^4 + 4 g^3(-4) + 6 g^2(-4)^2 + (4) g(-4)^3 + (-4)^4$$

$$g^4 - 16g^3 + 96g^2 - 256g + 256$$



6. Factor the polynomial completely:  $n^3 - 125$

$$(n-5)(n^2 + 5n + 25)$$

7. Divide using polynomial long division:  $(3x^4 - 2x^3 - 20x^2 + 11) \div (x^2 - 4x + 9)$

$$\begin{array}{r}
 3x^2 + 10x - 7 \\
 \hline
 x^2 - 4x + 9 \overline{) 3x^4 - 2x^3 - 20x^2 + 0x + 11} \\
 \underline{3x^4 + 12x^3 + 27x^2} \phantom{+ 0x + 11} \\
 10x^3 - 47x^2 + 0x \phantom{+ 11} \\
 \underline{10x^3 + 40x^2 + 90x} \phantom{+ 11} \\
 -7x^2 - 90x + 11 \\
 \underline{+ 7x^2 + 28x + 63} \\
 -118x + 74
 \end{array}$$

8. Divide using synthetic division:  $(3x^2 + 10x - 2) \div (x + 3)$

$$\begin{array}{r|rrr}
 -3 & 3 & 10 & -2 \\
 & & -9 & -3 \\
 \hline
 & 3 & 1 & -5
 \end{array}$$

$$3x + 1 - \frac{5}{x+3}$$

9. Describe the end behavior of the graph of the function:  $g(x) = 6x + 15 + 5x^3 - 9x^2 - 8x^4$

$$g(x) \rightarrow -\infty \quad \text{as} \quad x \rightarrow +\infty$$

$$g(x) \rightarrow -\infty \quad \text{as} \quad x \rightarrow -\infty$$

(D)



Algebra 2 Quiz #4 Part 2: Ch.1-3 Review (3 points each)

1. Write a function  $g$  whose graph represents the indicated transformation of the graph of  $f$ :

$f(x) = +|x+9| + 3$ ; translation 2 units right

(C)

$$g(x) = f(x-2)$$

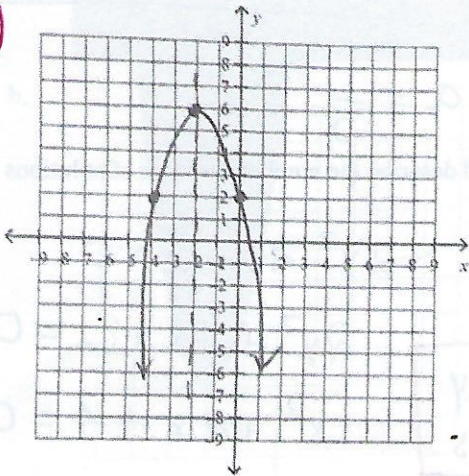
$$g(x) = -|(x-2)+9| + 3$$

$$= -|x-2+9| + 3 = \boxed{+|x+7| + 3}$$

2. Graph the function (1 point). Label the vertex and axis of symmetry (2 points):

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

(C)



vertex:  $x = -b/2a = \frac{-(-4)}{2(-1)}$   
 $= \frac{4}{-2} = -2$

$-(-2)^2 - 4(-2) + 2$   
 $= -4 + 8 + 2 = 6$        $(-2, 6)$

AOS:  $x = -2$

3. Solve the system:

$-2x - y = -5$

$-2x^2 - 2x + y = -11$

(B)

$y = -2x + 5$

$y = 2x^2 + 2x - 11$

$-2x + 5 = 2x^2 + 2x - 11$

$2x^2 + 2x + 2x - 11 - 5 = 0$

$2x^2 + 4x - 16 = 0$

$x = 4$

$x = -2$

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

$(x+4)(x-2) = 0$

$y = -2(-4) + 5 = 13$

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

~~$\begin{array}{r} -8 \\ 4 \times -2 \\ \hline 2 \end{array}$~~

$\boxed{\begin{array}{l} (-4, 13) \\ (2, 1) \end{array}}$



4. Solve the equation:  $2(x+2)^2 - 5 = 6$

(A)

$$2(x+2)^2 = 11$$

$$(x+2)^2 = \frac{11}{2}$$

$$x+2 = \pm \sqrt{\frac{11}{2}}$$

$$x+2 = \pm \frac{\sqrt{22}}{2} \Rightarrow$$

$$x = -2 \pm \frac{\sqrt{22}}{2}$$

5. Write an equation of the parabola in intercept form that has x-intercepts of 2 and -8 and passes through (-3, -5)

(C)

$$y = a(x-2)(x+8)$$

$$-5 = a(-3-2)(-3+8)$$

$$-5 = (-5)(a)(5)$$

$$-5 = -25a \Rightarrow a = \frac{1}{5}$$

$$y = \frac{1}{5}(x-2)(x+8)$$

6. Find the discriminant of the quadratic equation  $-2x^2 - 4x + 8 = 0$  and describe the number and type of solutions of the equation.

Value of discriminant (2 points):

$$-48$$

Number and type of solution (1 point):

2 imaginary solutions.

$$-2x^2 - 4x + 8 = 0$$

$$2x^2 + 4x - 8 = 0$$

$$x^2 + 2x - 4 = 0$$

$$b^2 - 4ac = 2^2 - 4(1)(-4)$$

$$= 4 - 16$$

$$= -12$$

or

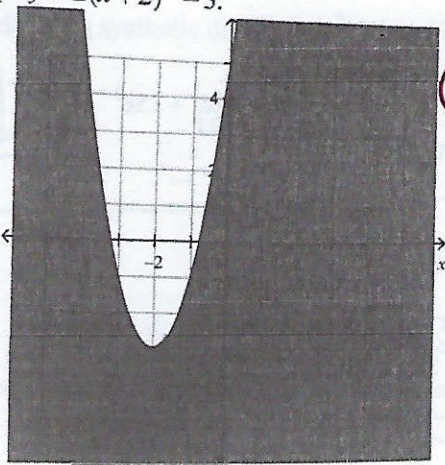
$$(-4)^2 - 4(-2)(-8)$$

$$16 - 64 = -48$$

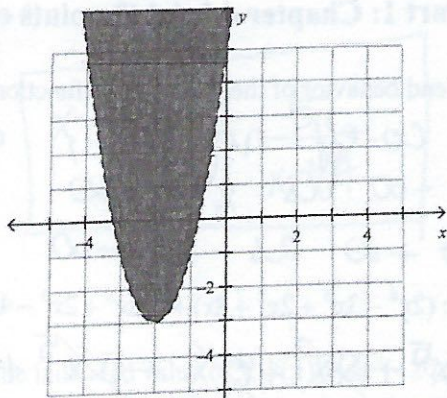


7. Graph  $y > 2(x+2)^2 - 3$ .

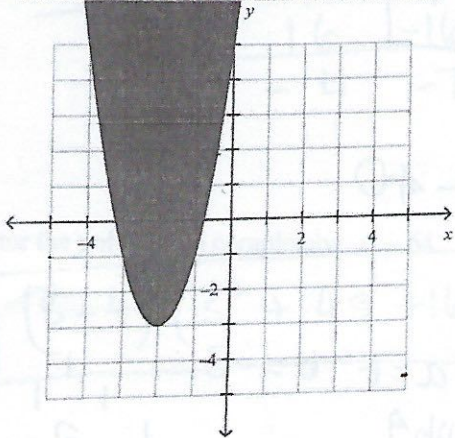
a.



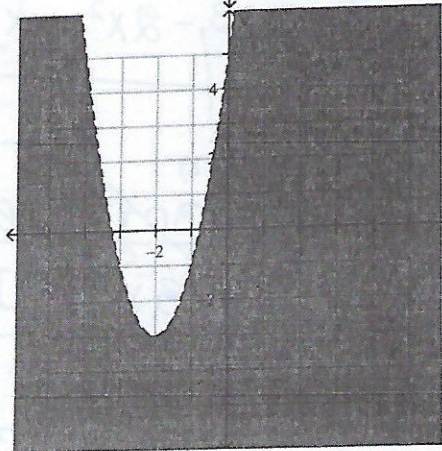
c.



b.



d.



8. Find the equation of a parabola that passes through  $(4, -13)$  and has vertex  $(6, -7)$ .

✓  $y = a(x-h)^2 + k$       $h = 6, k = -7$

Ⓒ  $y = a(x-6)^2 - 7 \Rightarrow -13 = a(4-6)^2 - 7$

$-13 = a(4) - 7$

$-6 = 4a$       $a = -\frac{3}{2}$

9. ✓ Perform the operation  $(-1 + 4i)(9 - 4i)$

$-9 + 4i + 36i - 16i^2$

$= -9 + 16 + 40i$

$= \boxed{7 + 40i}$

Ⓑ

$y = -\frac{3}{2}(x-6)^2 - 7$