

Name: _____ Date: _____ Period: _____

Algebra AB Final Review

Finish the following Exponential Properties

Product
 $x^a \cdot x^b =$

Power
 $(x^a)^b =$

Product to a
Power
 $(x^a y^b)^c =$

Quotient
 $\frac{x^a}{x^b} =$

Quotient to
Power
 $\left(\frac{x^a}{y^b}\right)^c =$

Negative Exponent
 $x^{-a} =$
 $\frac{1}{x^a} =$

Zero Exponent
 $x^0 =$

Rational Exponent
 $x^{\frac{n}{m}} =$

Simplify

1. $x^4 * x^5$

2. $4x^2 * -3x$

3. $2x^{-3}y^5$

4. $\frac{y^{-5}}{6x^{-3}}$

5. $(4x^3y^5)^3$

6. $x^2 * (3xy^2)^0$

7. x^{-2}

8. $\frac{1}{y^{-2}}$

9. $\frac{x^3y^{-5}x^0}{x^{-4}}$

10. $\frac{x^5}{x^2}$

11. $\frac{3z^3}{z^5}$

12. $\frac{6x^3y^0}{3x^2z^5}$

Simplify

$$13. \left(\frac{x^5}{y^2}\right)^3$$

$$14. \frac{x^3y^3}{5xy^2}$$

$$15. \frac{9x^2}{9x^3}$$

$$16. \frac{10y^3x^0}{5y^2x^3}$$

$$17. \left(\frac{8z^7}{5x^3}\right)^2$$

$$18. \left(\frac{ab}{4a^4b^5}\right)^3$$

$$19. \left(\frac{x^2}{y^{-2}}\right)^3$$

$$20. 2^0$$

Solve the following exponential equations

$$20. 3^{a-3} = 3^2$$

$$21. 5^{2-2n} = 5^{-3n}$$

$$22. 6^x = 1$$

$$23. 10^x = 10^{15}$$

$$24. 7^{1-x} = 7^4$$

$$25. 9 = 3^x$$

Simplify each expression with addition or subtraction

1. $(x + 3) + (x - 2)$

2. $(2x^2 - 1x - 5) + (x^2 + 7x - 1)$

3. $(-2p - p^2 + 4p^3) - (2p^2 + 7p)$

4. $(r^2 - 6r + 2) - (2r^2 + 5r - 9)$

5. $(2x + 7x) + (x + 4x^2) - (15x^2 + 4x - 6)$

6. $(3x^4 + x - 14) + (3y^2 + 13 - 5x + 8 - 7x^4)$

Find each product by using the distributive property

11. $x(3x + 3)$

12. $2v(5v^2 + v - 12)$

13. $6b(-2b + 1)$

14. $5x(2x^2 + x - 3)$

15. $(x + 3)(x + 2)$

16. $(3r + 2)(2r - 1)$

Find each product by using the distributive property.

17. $(q - 3)(q - 7)$

18. $(9z - 1)(4z + 8)$

19. $(x + 5)(2x^2 - 2x + 3)$

20. $(x + 3)^2$

Simplify each expression by applying the distributive property and combining like terms.

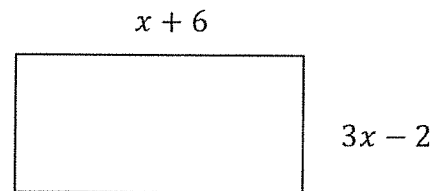
21. $2x(x + 6) + (x + 3)$

22. $-u(v^2 + 2v - 3) - (v^2 + 6)$

Find the area and perimeter of each. Simplify your answer.

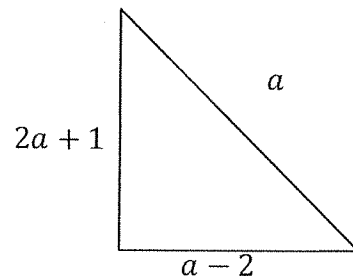
23. A= _____

P= _____



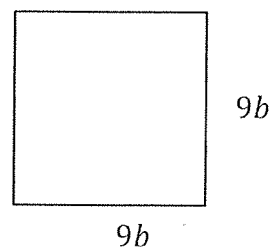
24. A= _____

P= _____



25. A= _____

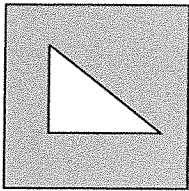
P= _____



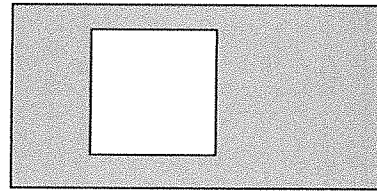
Application problems: Find the area of the shaded region in the simplest form.

$$(BIG\ SHAPE) - (LITTLE\ SHAPE) = SHADED\ REGION$$

26. A Square has a side length of 8 has a triangle of base 4 and height 3 cut out of it.

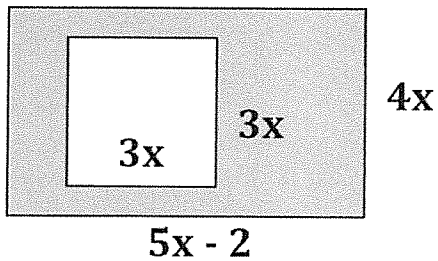


27. A rectangle with width of 7 and length of 9 has a square of side length 5 cut out of it.

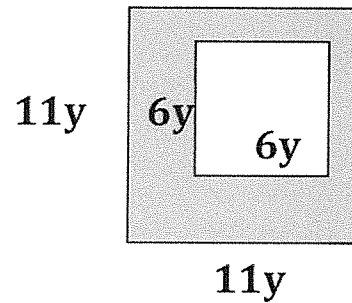


What is the area of the shaded region?

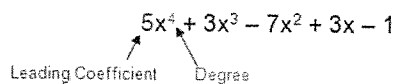
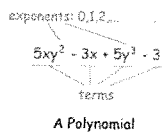
28.



29.



Identifying Polynomials



Identification by number of terms

$2x$	Monomial	Monomials consist of 1 term
$2x + 3y$ ↑ ↑ 1 2	Binomial	Binomials consist of 2 terms
$2x^2 + 3x + 5$ ↑ ↑ ↑ 1 2 3	Trinomial	Trinomials consist of 3 terms.
$3x^3 + 2x^2 - 6x + 2$ ↑ ↑ ↑ ↑ 1 2 3 4	Polynomial	If there are more than 3 terms, use the term polynomial.

Identification by degree

5	Constant	A number on it's own is considered a constant monomial.
$2x + 1$	Linear 1 st Degree	Highest degree is 1 making this a Linear Binomial. OR 1 st Degree Binomial
$3x^2 + 2x + 1$	Quadratic 2 nd Degree	Highest degree is 2 making this a Quadratic Trinomial. OR 2 nd Degree Trinomial
$x^3 + 3$	Cubic 3 rd degree	Highest degree is 3 making this a Cubic Binomial. OR 3 rd Degree Binomial
$x^5 + 2x^3 + 3x^2 + 2x$	5 th degree	5 th Degree 4 Termed Polynomial.

Name each polynomial by degree and number of terms.

30. $3x^2 + 2x$

31. 7

32. $3x + 4$

33. $-5p^3 + 2p^2 - 5$

34. $-8n^4 + 5n^3 - 2n^2 - 8n$

35. $\frac{5}{x^2 + 3x}$

36. $9v^7 + 7v^6 + 4v^3 - 1$

Identify the GCF of each Polynomial.

31. $6x^2, x$

32. $-12x^2y, 3xy^2, 9x^3y^3$

33. x^{10}, x^{11}, x^{100}

34. $xyz, x^2y^2z^2, x^3y^3$

35. abc, ab, bc, cd

36. $12x^2, 4x, 4$

Factor out the GCF

37. $32x^2y^8 + 8x^3y^5$

38. $-8x^3 + 4x^2$

39. $50x - 45$

40. $60m^2n^5 + 12m^2n^6 + 18m^4n^6$

41. $3x^2 - x$

Identify and factor the following special polynomials as Perfect Square Trinomials or Difference of Squares. Look for the GCF first.

42. $16p^2 - 25$

43. $4x^2 + 10x + 25$

44. $4x^2 - 1$

45. $16x^2 - 12x + 36$

Factor completely. Make sure to look for the GCF first!

46. $x^2 - 12x + 35$

47. $n^2 + 9n - 10$

Factor Completely. Make sure to look for the GCF first!

48. $3m^2 + 6m + 3$

49. $2p^2 + 18p + 16$

50. $2n^2 + 3n - 9$

51. $5n^2 + 19n + 12$

52. $2n^2 + 5n + 2$

53. $3k^2 + 34k + 63$

54. $4n^2 - 45n + 50$

55. $42x^2 + 204x + 144$

Factor Completely by Grouping

56. $20x^3 + 16x^2 - 5x - 4$

57. $10x^2 + 35x^2 - 12x - 42$

Quadratics

Determine the transformation that occurs from the parent function $f(x) = x^2$ to the new function

58. $g(x) = -5x^2 + 1$

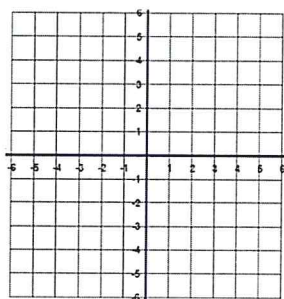
59. $g(x) = (x - 7)^2$

60. $g(x) = -1/3(x + 1)^2 + 8$

62. Given the equation, identify the missing information.

$$Y = -\frac{1}{2}(x + 1)^2 + 1$$

X	Y



Axis of Symmetry:

Min/Max

Vertex

Domain:

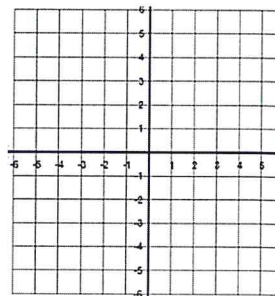
Max/Min Value:

Range:

61. Given the equation, identify the missing information.

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

X	Y



Axis of Symmetry:

Min/Max

Vertex

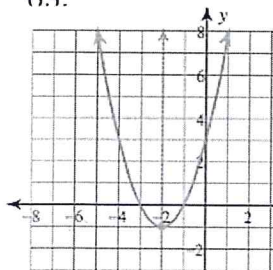
Domain:

Max/Min Value:

Range:

Given the graphs below, State how many solutions there are, what the solutions are, the vertex, and the axis of symmetry.

63.

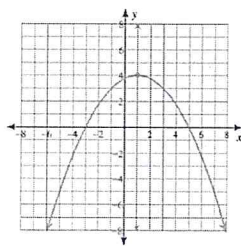


Number of Solutions

Solutions:

Vertex: AOS

64.

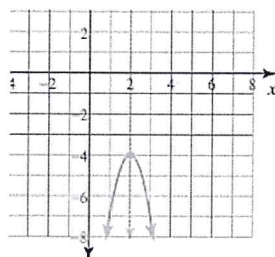


Number of Solutions

Solutions:

Vertex: AOS

65.

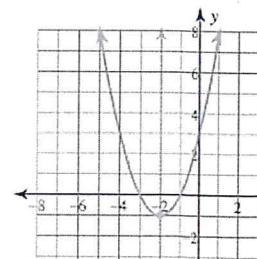


Number of Solutions

Solutions:

Vertex: AOS

66.

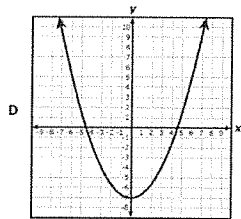
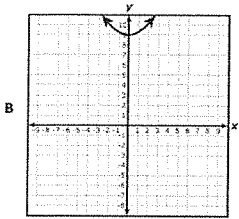
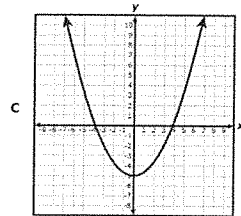
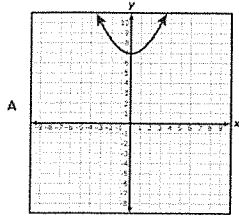


Number of Solutions

Solutions:

Vertex: AOS

67. Which graph can be obtained by translating the graph of $h(x)=0.33x^2+2$ up 7 units?



68. $f(x) = \frac{3}{4}x^2 + 4$ $h(x) = -\frac{3}{4}x^2 + 7$
 $g(x) = -\frac{2}{3}x^2 + 5$ $j(x) = \frac{2}{3}x^2 + 4$

Which 2 equations have same y-int? _____

Which 2 equations have a maximum? _____

Which 2 equations DON'T cross the x axis? _____

69. Which function's graph has a vertex at (3, 5) and contains the point (5, 13)?

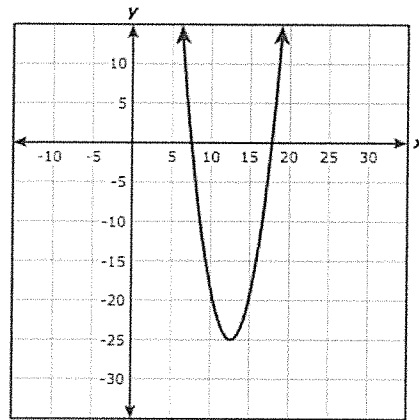
F $y = \frac{1}{10}(x+3)^2 - 5$

G $y = \frac{1}{10}(x-3)^2 - 5$

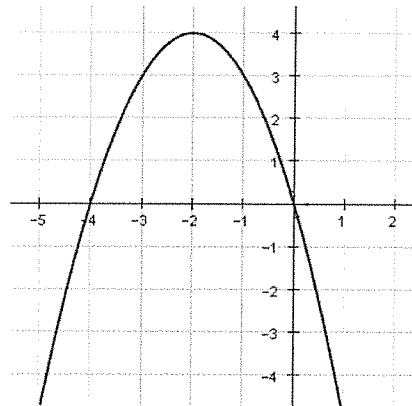
H $y = 2(x-3)^2 + 5$

J $y = 2(x+3)^2 +$

70. Estimate the vertex of the following parabola.



71.



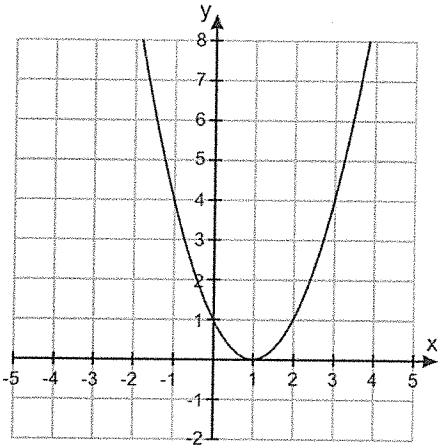
Vertex: _____ Max/Min: _____

Axis of symmetry: _____

Zero(s): _____

Y-intercept: _____

72.



Vertex: _____ Max/Min: _____

Axis of symmetry: _____

Zero(s): _____

Y-intercept: _____

73.

X	-8	-9	-10	-11	-12
Y	0	2	4	2	0

Vertex: _____ Max/Min: _____

Axis of symmetry: _____

Root(s): _____

Y-intercept: _____

74.

x	Y
-4	8
-3	4
-2	1
-1	0
0	1

Vertex: _____

Max/Min: _____

Axis of symmetry: _____

Root(s): _____

Y-intercept: _____

75. Use the calculator to find a quadratic function $f(x) = ax^2 + bx + c$ that provides a reasonable fit to the data.

X	0	.5	1	1.5	2	2.5
Y	4	37.5	63	80.5	90	91.5

Equation: _____

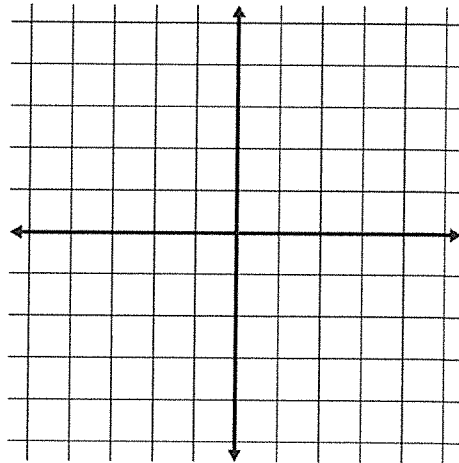
76. Use the calculator to find a quadratic function $f(x) = ax^2 + bx + c$ that provides a reasonable fit to the data.

X	-3	-1	2	5	8
Y	5	0	9	24	81

Equation: _____

77. Graph the following equation, then list the vertex, axis of symmetry, and min/max value. You must have points on your graph.

$$y = 2x^2 - 3$$

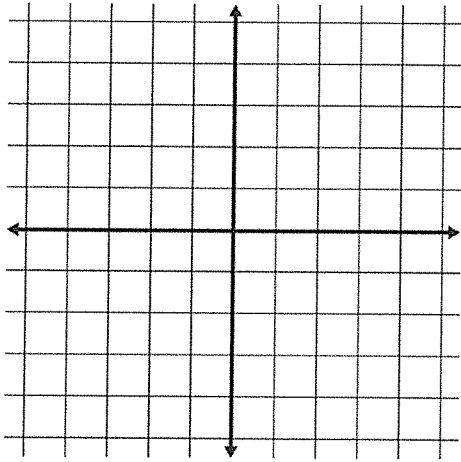


Vertex: _____ Min/Max: _____

Axis of Symmetry: _____

78. Graph the following equation. You must have points on your graph.

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

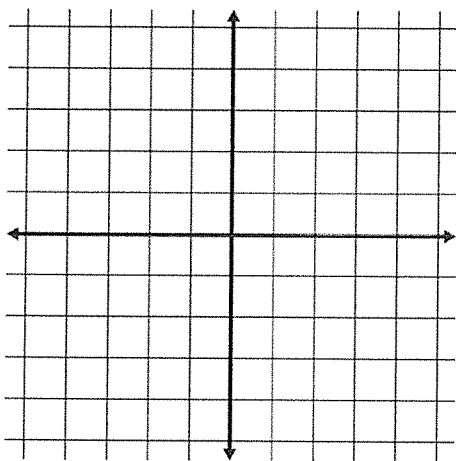


Vertex: _____ Min/Max: _____

Axis of Symmetry: _____

79. Graph the three equations below on the graph provided. Then put the equations in order from the widest graph to the narrowest graph. You must have points on your graph or no credit will be given.

$$y = x^2 \quad y = \frac{1}{3}x^2 \quad y = 3x^2$$



Widest to Narrowest:

80. Determine the transformation that occurs from the parent function

$$f(x) = x^2$$

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

- Reflection, stretch, shift up 4 units
- Reflection, compression, shift up 4 units
- Reflection, shift up 4 units
- Compression, shift up 4 units.

81. Determine the transformation that occurs from the parent function

$$f(x) = x^2$$

$$g(x) = (x + 8)^2$$

- Shift up 8 units
- Shift down 8 units
- Shift left 8 units
- Shift right 8 units.

82. Given the equation, identify the missing information.

$$Y = -2(x + 1)^2 - 4$$

Vertex:

Axis of Symmetry:

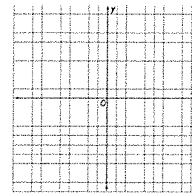
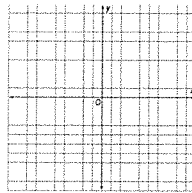
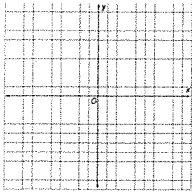
Max/Min value:

Is this a max/min?

Domain:

Range:

83. Label and sketch the possible solutions for quadratic equations as one solution, two solutions, or zero real solutions.



Solve the following quadratic equations with the square root.

84. $x^2 - 16 = 0$

85. $2x^2 - 18 = 0$

86. $7x^2 = 0$

Use the Zero-Product Property to solve each equation.

87. $(x + 6)(x - 4) = 0$

88. $d(d - 8) = 0$

89. $(3f + 2)(2f - 5) = 0$

Use Factoring and the Zero-Product Property to solve the following quadratics.

90. $x^2 + 2x - 15 = 0$

91. $x^2 - 15x + 56 = 0$

92. $z^2 - 10z = -24$

93. $3b^2 + 7b - 6 = 0$

Change the following expressions from exponential to radical form.

94. $x^{\frac{3}{4}}$

95. $3x^{\frac{4}{5}}$

Evaluate the following radicals

96. $\sqrt{81}$

97. $\sqrt{36x^2}$

98. $\sqrt{20x^3yz^4}$

99. $2\sqrt{80p^4}$

Simplify the following radical expressions using addition or subtraction. You may have to simplify a radical before you can combine.

100. $-11\sqrt{21} + 12\sqrt{21}$

101. $-5\sqrt{11} - 10\sqrt{11}$

102. $2\sqrt{6} + 3\sqrt{54}$

103. $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$

Simplify the following radical expression using multiplication. Your final answer must be completely simplified.

104. $3\sqrt{12} * \sqrt{6}$

105. $-4\sqrt{15} * -\sqrt{3}$

Simplify the following radical expression using multiplication. Your final answer must be completely simplified.

106. $\sqrt{20x^2} * \sqrt{20x}$

107. $\sqrt{3v}(\sqrt{6} + 2)$

108. $(\sqrt{x} + 4)(\sqrt{x} - 4)$

Evaluate each function for $x = -1, 1, 2$.

107. $f(x) = 4 \cdot 7^x$

108. $y = \frac{2}{3} \cdot 6^x$

109. A population of 2000 fish increases at an annual rate of 9.3%.

- a. Write an expression to represent the equivalent monthly increase in population.
- b. How many fish will there be in 5 years?
- c. How many fish will there be in 10 years?

Without graphing, tell whether the function represents *exponential growth* or *exponential decay*. Then identify the first term and the amount your function is increasing by.

110. $y = 6.6 \cdot 2^x$

111. $g(x) = 7.6 \left(\frac{1}{8}\right)^x$

The following topics may also appear on your final exam!

- Solving Equations
- Slope!!!
- Graphing and Writing Linear Equations
 - Slope Intercept
 - Point Slope
- Systems of Equations
 - Substitution
 - Elimination
 - Graphing
- Domain/Range of anything
- Pythagorean Theorem