

Algebra 1 B Exam Review

NAME _____

Unit 6 Exponent Rules and Polynomials

Simplify. Assume that no denominator is equal to zero.

1. $(3a^4b^2c)(ab^2c^4)$
 $3a^5b^4c^5$

2. $(5x^2y^3)^3$
 $125x^6y^9$

3. $\frac{a^{12}}{a^4}$
 a^8

4. $\frac{n^5}{n^3}$
 n^2

5. $\frac{6n^3y}{2n^{-1}y^{-3}}$
 $\frac{3n^4y^4}{n^2} = \frac{3y^4}{n^2}$

6. $\left(\frac{5x}{x^3}\right)^{-4} = \left(\frac{x^3}{5x}\right)^4$
 $\frac{x^{12}}{625x^4} = \frac{x^8}{625}$

7. Find the degree of the polynomial.

$2x^3y - 4xy^2 + 9x^3y^2$
 4 3 5 Degree = 5

8. Arrange the terms of the polynomial so that the "powers of x" are in descending order.

$8x^2y^3 + x^5y - 5x^3y^3 + y^7$
 3rd 1st 2nd 4th
 $= x^5y - 5x^3y^3 + 8x^2y^3 + y^7$

Find the sum or difference.

9. $(n^2 + 3n) + (2n^2 - n)$
 $3n^2 + 2n$

10. $(9t^2 + 4t - 6) - (t^2 + 2t + 4)$
 $8t^2 + 2t - 10$

11. $3b^2(4b + 7) - 2b(b^2 - 5b - 3)$
 $12b^3 + 21b^2 - 2b^3 + 10b^2 + 6b$
 $10b^3 + 31b^2 + 6b$

Solve the equation.

12. $4(2x+1) - 12x = 2(8x+12)$

$$8x + 4 - 12x = 16x + 24$$

$$-4x + 4 = 16x + 24$$

$$-20 = 20x$$

$$x = -1$$

13. $2(6x+4) + 2 = 4(x-4)$

$$12x + 8 + 2 = 4x - 16$$

$$12x + 10 = 4x - 16$$

$$8x = -26$$

$$x = -3.25$$

Find the product.

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

$$-15x^5 - 15x^4 + 9x^3$$

15. $4a(-2a^3 - 7a^2 + 3a - 11)$

$$-8a^4 - 28a^3 + 12a^2 - 44$$

16. $(x+2)(x+4)$

$$x^2 + 4x + 2x + 8$$

$$x^2 + 6x + 8$$

17. $(x+4)(x-8)$

$$x^2 + 4x - 8x - 32$$

$$x^2 - 4x - 32$$

18. $(3x+2)(4x^2-2x-7)$

$$12x^3 - 6x^2 - 21x$$

$$+ 8x^2 - 4x - 14$$

$$12x^3 + 2x^2 - 26x - 14$$

Unit 7 Factoring Polynomials with GCF and XBox

Factor the polynomial, if possible. If the polynomial cannot be factored using integers, write prime.

1. $3ab^3c - 9b^2c + 12b^3$

GCF = $3b^2$

$3b^2(abc - 3c + 4b^3)$

2. $6x^2 - 4x - 3x + 2$

Group/Box

	$3x - 2$
$2x$	$6x^2 - 4x$
-1	$-3x + 2$

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

3. $z^2 - 11z + 30$

X BOX

$(z - 5)(z - 6)$

4. $3x^2 + 7x + 2$

X BOX

~~$\frac{6}{7}$~~ $3x^2 + 1x + 6x + 2$
 $x(3x + 1) + 2(3x + 1)$
 $(x + 2)(3x + 1)$

5. $2h^2 + 9h - 5$

X BOX

$(2h - 1)(h + 5)$

6. $16h^2 - 64$

X BOX

$(4h + 8)(4h - 8)$

or

$4(4h^2 - 16)$

$4(2h + 4)(2h - 4)$

7. $64x^2 - 25$

X BOX

$(8x - 5)(8x + 5)$

Solve the equation.

8. $64w^2 = 9$

$64w^2 - 9 = 0$

$(8w + 3)(8w - 3) = 0$

$w = -\frac{3}{8}, \frac{3}{8}$

9. $5g^2 - 22g + 8 = 0$

$(5g - 2)(g - 4) = 0$

$g = \frac{2}{5}, 4$

10. $c^2 + 4c = 45$

$c^2 + 4c - 45 = 0$

$(c + 9)(c - 5) = 0$

$c = -9, 5$

11. $6x^2 + 7x - 3 = 0$

$(2x + 3)(3x - 1) = 0$

$x = -\frac{3}{2}, \frac{1}{3}$

12. $(8x - 16)(6 - 2x) = 0$

$x = +\frac{16}{8}, -\frac{6}{-2}$

$= +2, +3$

13. $10x^2 = 8x$

$10x^2 - 8x = 0$

$2x(5x - 4) = 0$

$x = 0, x = \frac{4}{5}$

Unit 8 Radicals and Jail Break

Simplify each expression

1. $\sqrt{40} = \sqrt{2 \cdot 2 \cdot 2 \cdot 5}$
 $= 2\sqrt{10}$

2. $\sqrt{5} \cdot \sqrt{60} = \sqrt{5 \cdot 2 \cdot 3 \cdot 2 \cdot 5}$
 $= 5 \cdot 2\sqrt{3}$
 $= 10\sqrt{3}$

3. $\frac{\sqrt{8}}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{48}}{6}$
 $\frac{\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}}{6} = \frac{4\sqrt{3}}{6} = \frac{2\sqrt{3}}{3}$

4. $8\sqrt{54} - 4\sqrt{6}$
 $8\sqrt{3 \cdot 3 \cdot 3} - 4\sqrt{6}$
 $8 \cdot 3\sqrt{3} - 4\sqrt{6}$
 $24\sqrt{3} - 4\sqrt{6}$
 $= 20\sqrt{6}$

5. $4\sqrt{3} + 2\sqrt{12}$
 $4\sqrt{3} + 4\sqrt{3}$
 $8\sqrt{3}$

6. $\sqrt[3]{64}$
 $= \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$
 $= 2$

7. $\sqrt[4]{81} =$
 $\sqrt[4]{3 \cdot 3 \cdot 3 \cdot 3}$
 $= 3$

8. $2(\sqrt{3} + 4\sqrt{5})$
 $2\sqrt{3} + 8\sqrt{5}$

$(4 + \sqrt{3})(4 - \sqrt{3})$
 $16 - 4\sqrt{3} + 4\sqrt{3} - \sqrt{9}$
 $16 - 3$
 $16 - 3 = 13$

10. $27^{\frac{2}{3}}$ Flower-power Root Rule!

$(\sqrt[3]{27})^2 = 3^2 = 9$

11. $64^{-\frac{2}{3}}$
 $(\sqrt[3]{64})^{-2}$
 $= 4^{-2} = \frac{1}{16}$

12. $8^{-\frac{5}{3}}$
 $(\sqrt[3]{8})^{-5}$
 $= 2^{-5} = \frac{1}{2^5} = \frac{1}{32}$

13. Write the expression $\sqrt[4]{x^4}$ in root notation. $\sqrt[4]{x^4}$

14. Write the expression $\sqrt[3]{18^3}$ in exponent notation. $18^{\frac{3 \cdot 4}{4}}$

Unit 9 Quadratic Formulas (Parabolas)

1. Write the equation for the axis of symmetry for the graph of $y = 2x^2 + 4x - 2$. $x = \frac{-b}{2a}$

$$x = \frac{-4}{2(2)} = -1 \quad x = -1$$

2. What are the coordinates of the vertex of the graph? $(-1, -4)$

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

$$2 - 4 - 2 = -4$$

Plug-in

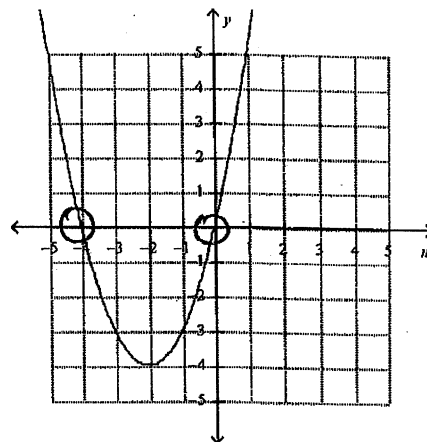
Use the graph to the right to answer questions 13-16.

3. How many real roots does it have? 2

4. What are the solution(s)? -4, 0

5. Does the parabola open up or down? up

6. Is the vertex a minimum or maximum? min



Solve the equation by using the Quadratic Formula. Round to the nearest tenth if necessary.

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

7. $2x^2 + 5x - 7 = 0$

$$x = \frac{-5 \pm \sqrt{25 - 4(2)(-7)}}{2(2)}$$

$$= \frac{-5 \pm \sqrt{81}}{4}$$

$$= \frac{-5 \pm 9}{4} = 1, -3.5$$

8. $x^2 - 6x - 9 = 0$

$$x = \frac{6 \pm \sqrt{36 - 4(1)(-9)}}{2(1)}$$

$$= \frac{6 \pm \sqrt{72}}{2}$$

$$= \frac{6 \pm 8.49}{2} = -1.245 \text{ and } 7.245$$

9. $3x^2 - 7x - 6 = 0$

$$x = \frac{7 \pm \sqrt{49 - 4(3)(-6)}}{2(3)}$$

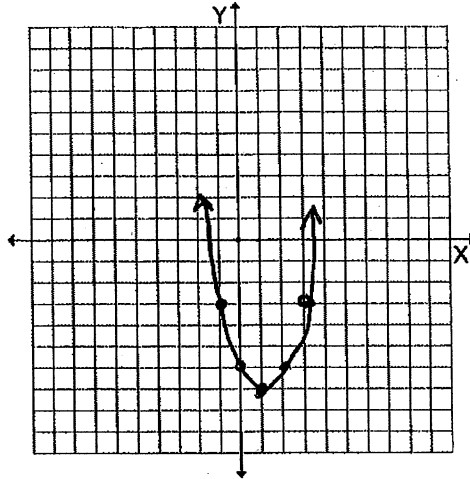
$$= \frac{7 \pm \sqrt{121}}{6}$$

$$= \frac{7 \pm 11}{6} = \frac{-4}{6} \text{ and } 3$$

up/min

10. Graph $y = x^2 - 2x - 6$ $x = \frac{+2}{2(1)} = 1$

x	y
-1	-3
0	-6
✓ 1	-7
2	-6
3	-3

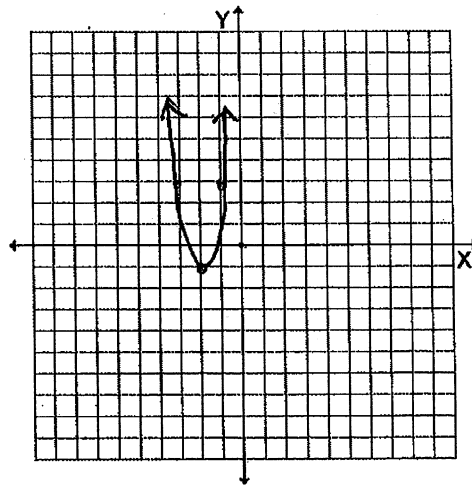


11. Given the equation $y = 4(x+2)^2 - 1$, what is the vertex of its graph? (-2, -1)

up/min

x	y
-4	15
-3	3
✓ -2	-1
-1	3
0	15

family functions



12. Given the equation $y = 4(x+2)^2 - 1$, what is the vertex of its graph? (-2, -1)

↑ ↑

-n v

family functions

13. Given the equation $y = (x-6)^2$, what is the vertex of its graph? (6, 0)

↘

+0

UNIT 10 Exponential Functions (Growth and Decay)

1. Which equation models exponential growth?

a. $y = 3x$

b. $y = 6^x$

c. $y = \left(\frac{1}{4}\right)^x$

d. $y = 2(0.5)^x$

2. Which equation displays exponential decay?

a. $y = 3x$

b. $y = 6^x$

c. $y = \left(\frac{1}{4}\right)^x$

d. $y = 2(0.5)^x$

WRITE the FORMULAS

Exponential Growth: $y = b(a^x)$ $a > 1$
 $y = P(1+r)^x$ Key words: increase, growths

Exponential Decay: $y = b(a^x)$ $a < 1$
 $y = P(1-r)^x$ key words: decrease, depreciates

Half-Life: $y = P\left(\frac{1}{2}\right)^x$ * years
 key word: half-life Half-life

Percent Growth: See above. PERCENT DECAY: See above.
 key words: _____ key words: _____

3. Computer use around the world has risen 18% annually since 1980. If 17.9 million computers were in use in 1985, write an equation for the number of computers in use for t years after 1985.

Equation: $y = 17.9(1 + .18)^5$

$18\% = .18$

units

4. If the number of rabbits in a cage double every two years, how many will be in the cage after 6 years if you start out with 2?

Equation: $y = 2(2)^3$

Answer: 16 rabbits

$\frac{6}{2} = 3 \text{ times}$

5. Tim bought an SUV for 43,500 in 2006. What is the value of the SUV in 2008 if it depreciates at 14% each year?

Equation: $y = 43,500(1 - .14)^2$

Answer: \$32,172.6

6. Carbon-10 has a half-life of 1,620 years. If you begin with 4 grams of Carbon-10, how much will remain after 3 half life periods?

Equation: $y = 4\left(\frac{1}{2}\right)^3$

Answer: .5 grams

7

7. The Johnson family purchased a new home in 2003 for \$225,000. The value has appreciated 7.5% each year. What will the home be worth in 2012?

Equation: $y = 225,000(1 + 0.075)^9$ Answer: \$431,378.70

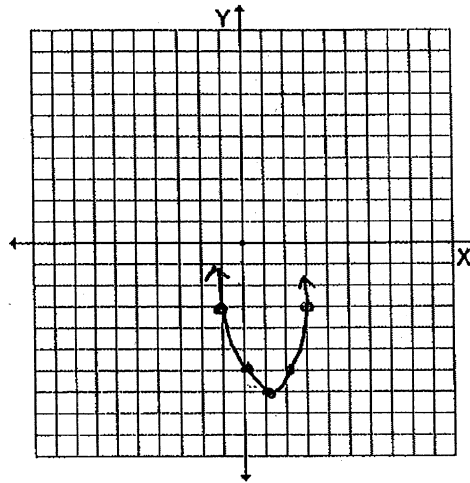
8. If you invest \$1,000 compounded monthly at a rate of 5%, how much will be in the account after 10 years?

Equation: _____ Answer: _____

9. Graph $y = x^2 - 2x - 6$

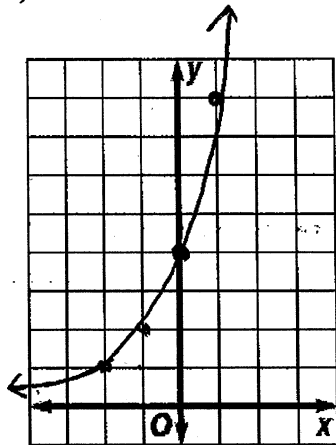
$V = \frac{-2}{2(1)} = 1$

x	y
-1	-3
0	-6
1	-7
2	-6
3	-3



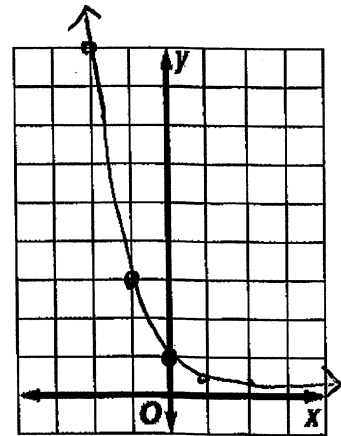
10. Graph $y = 4(2^x)$

x	y
-2	1
-1	2
0	4
1	8
2	16



11. Graph $y = (\frac{1}{3})^x$

x	y
-2	9
-1	3
0	1
1	1/3
2	1/9



Start = 4
G. rate = 2

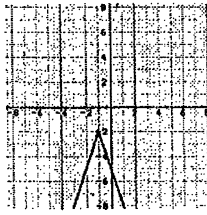
UNIT 11: Family Functions

Match each equation to its graph AND write which family function it is.

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

Quadratic

A.



absolute value
#2

2. $y = -3|x+1| - 2$

A
abs. value.

B.

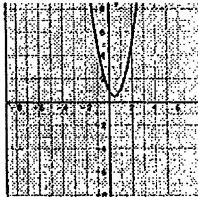


Cubic
#6

3. $y = \sqrt{x+4} + 1$

E
Sq. Root

C.

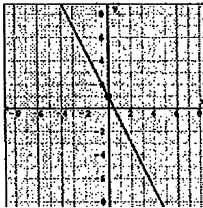


Quadratic
#1

4. $y = 4(2.93)^x$

F
Exponential
(Growth)

D.

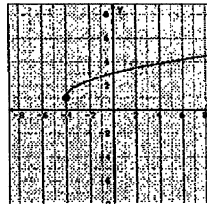


linear
#7

5. $y = \frac{x+4}{x-1}$

G
Rational

E.

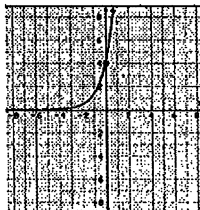


square root
#3

6. $y = 2x^3 - 5x^2 + 2x - 3$

B
Cubic

F.

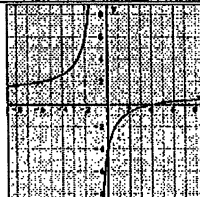


exponential
#4

7. $y = -2x + 1$

D
linear

G.



Rational
#5