

Name: Key
Algebra 1

Date: _____
Band: _____

June 2015 Practice PBA

Unit 6: Exponents and Exponential Functions

Simplify using only positive exponents.

1. $\left(\frac{27a^5b^4}{9a^2b}\right)^{-2}$

$(3a^3b^3)^{-2}$

$3^{-2}a^{-6}b^{-6}$

$\frac{1}{3^2a^6b^6} = \boxed{\frac{1}{9a^6b^6}}$

2. $\frac{5x^2y^3}{3x^3y^4}$

$\boxed{\frac{5}{3xy}}$

3. $\frac{(5^{-3})(7^2)}{(5^6)(7^{-8})}$

$(-5)^{-9} (7)^{10}$

$\boxed{\frac{7^{10}}{5^9}}$

4. $(2x^4y^3)^2$

$2^2x^8y^6$

$\boxed{4x^8y^6}$

5. $\frac{4^{-3} \cdot 5^4 \cdot 2^5}{5^3 \cdot 3^{-2} \cdot 3^0}$

$\frac{5^1 \cdot 3^2 \cdot 2^5}{4^3}$

$\frac{1440}{64} = \boxed{22.5}$

6. $\frac{4x^{-4}y^3}{8x^2y^{-6}}$

$\frac{1}{2}x^{-6}y^9$

$\boxed{\frac{y^9}{2x^6}}$

7. $7x^2y^{-1}(2xy^2)^3$

$7x^2y^{-1} \cdot 2^3x^3y^6$

$7x^2y^{-1} \cdot 8x^3y^6$

$\boxed{56x^5y^5}$

8. $\left(\frac{4x^2y^5}{12x^3y^2z^0}\right)^{-3}$

$\left(\frac{12x^3y^2}{4x^2y^5}\right)^3$

$(3xy^{-3})^3$

$3^3x^3y^{-9}$

$\boxed{\frac{27x^3}{y^9}}$

9. $2x^0(2x^3)^2$

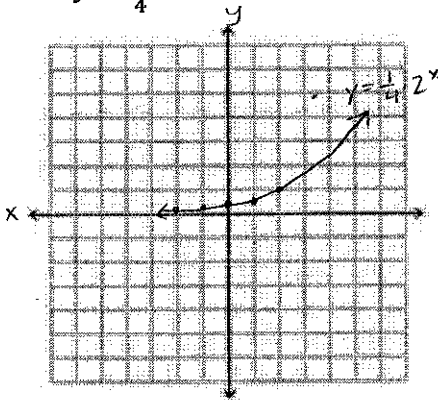
$2 \cdot 2^2x^6$

$2 \cdot 4x^6$

$\boxed{8x^6}$

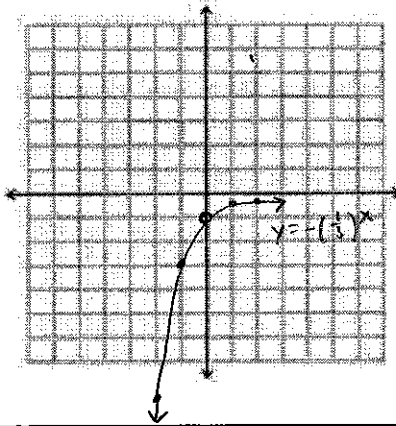
Graph each exponential function.

10. $y = \frac{1}{4} \cdot 2^x$



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

11. $y = -\left(\frac{1}{3}\right)^x$



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

Unit 7: Polynomials & Factoring

Simplify.

12. $3(x^2 + 1) - 5x(x^2 + x + 1)$

$3x^2 + 3 - 5x^3 - 5x^2 - 5x$

$-5x^3 - 2x^2 - 5x + 3$

13. $(2x^2 - 4x + 8) - (3x^2 + 10x + 2)$

$2x^2 - 4x + 8 - 3x^2 - 10x - 2$

$-x^2 - 14x + 6$

14. $(4x + 2)(x^2 - 2x - 3)$

$4x^3 - 8x^2 - 12x + 2x^2 - 4x - 6$

$4x^3 - 6x^2 - 16x - 6$

15. $2xy^2(3x^2 - 2y) - x^2y(2x - 3xy)$

$6x^3y^2 - 4xy^3 - 2x^3y + 3x^3y^2$

$9x^3y^2 - 4xy^3 - 2x^3y$

16. $(6x^3 - 2x^2 - 5x) - (x^3 - 9x^2 + 4)$

$6x^3 - 2x^2 - 5x - x^3 + 9x^2 - 4$

$5x^3 + 7x^2 - 5x - 4$

17. $(2x + 3)^2 = (2x + 3)(2x + 3)$

$4x^2 + 6x + 6x + 9$

$4x^2 + 12x + 9$

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

$$x^2 + 3x + 4 + 2x + 4$$

$$\boxed{x^2 + 5x + 8}$$

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

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

$$\boxed{x^2 + 4x + 4}$$

Factor.

20. $x^2 + 6x - 27$

$$\begin{array}{r|l} -27 & 6 \\ \hline 9, -3 & 6 \end{array}$$

$$\boxed{(x + 9)(x - 3)}$$

21. $x^2 + 8x + 12$

$$\begin{array}{r|l} 12 & 8 \\ \hline 6, 2 & 8 \end{array}$$

$$\boxed{(x + 6)(x + 2)}$$

22. $5z^2 + 19z - 4$

$$\begin{array}{r|l} -26 & 19 \\ \hline 20, -1 & 19 \end{array}$$

$$5z^2 + 20z - z - 4$$

$$5z(z + 4) - 1(z + 4)$$

$$\boxed{(5z - 1)(z + 4)}$$

23. $4n^2 - 8n + 3$

$$\begin{array}{r|l} 12 & -8 \\ \hline -6, -2 & -8 \end{array}$$

$$4n^2 - 6n - 2n + 3$$

$$2n(2n - 3) - 1(2n - 3)$$

$$\boxed{(2n - 1)(2n - 3)}$$

24. $r^2 - 11r + 24$

$$\begin{array}{r|l} 24 & -11 \\ \hline -8, -3 & -11 \end{array}$$

$$\boxed{(r - 8)(r - 3)}$$

25. $n^2 - 3n - 10$

$$\begin{array}{r|l} -10 & -3 \\ \hline -5, 2 & -3 \end{array}$$

$$\boxed{(n - 5)(n + 2)}$$

Factor Completely.

26. $6x^4 - 21x^3 - 12x^2$

$$\begin{array}{r|l} -8 & -7 \\ \hline -8, 1 & -7 \end{array}$$

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

$$3x^2(2x^2 - 8x + x - 4)$$

$$3x^2[2x(x - 4) + 1(x - 4)]$$

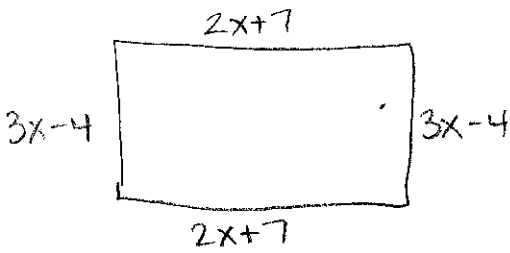
$$\boxed{3x^2(2x + 1)(x - 4)}$$

27. $8g^3 - 32g$

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

$$\boxed{8g(g - 2)(g + 2)}$$

28. A rectangle has length $(2x + 7)$ and width $(3x - 4)$. What is the perimeter and area of the rectangle?



$$\text{perimeter} = 2x+7+2x+7+3x-4+3x-4$$

$$= \boxed{10x+6}$$

$$\text{area} = (2x+7)(3x-4) = 6x^2 - 8x + 21x - 28$$

$$= \boxed{6x^2 + 13x - 28}$$

29. What is the leading coefficient and degree of $-3c^7 + 8c^3 + c$?

leading coefficient = -3

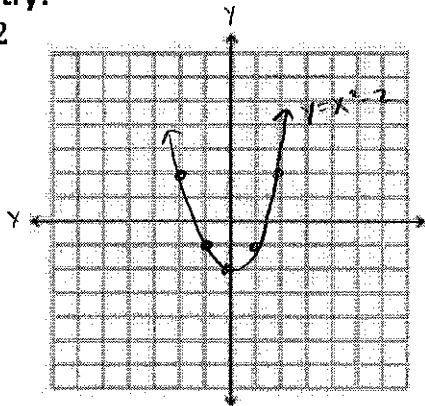
degree = 7

Unit 8: Quadratic Functions & Equations

Graph at least 5 points of each equation by making a table of values. What is the vertex? What is the axis of symmetry?

30. $y = x^2 - 2$

x	y
-2	2
-1	-1
0	-2
1	-1
2	2



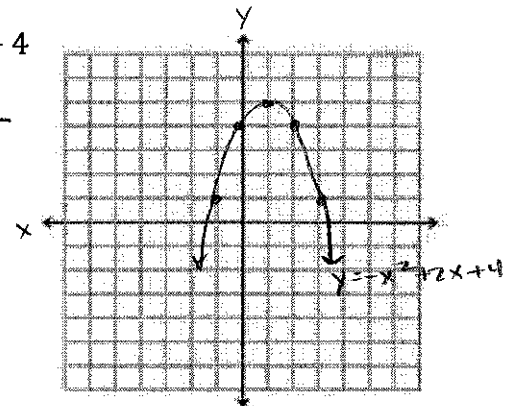
vertex: $(0, -2)$

axis: $x=0$

31. $y = -x^2 + 2x + 4$

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

x	y
-1	1
0	4
1	5
2	4
3	1

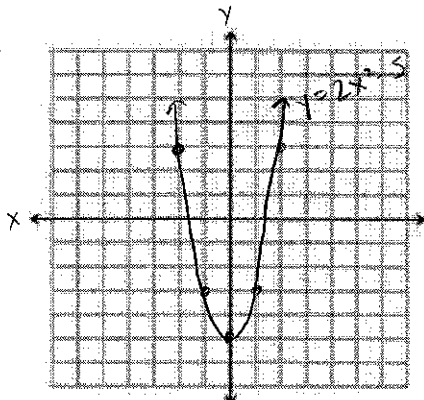


vertex: $(1, 5)$

axis: $x=1$

32. $y = 2x^2 - 5$

x	y
-2	3
-1	-3
0	-5
1	-3
2	3

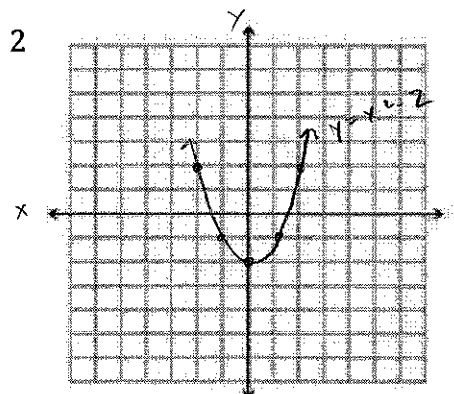


vertex: $(0, -5)$

axis: $x=0$

33. $y = x^2 - 2$

x	y
-2	2
-1	-1
0	-2
1	-1
2	2



vertex: $(0, -2)$

axis: $x=0$

Solve.

34. $3x^2 + 11x - 4 = 0$

$(3x - 1)(x + 4) = 0$

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

$\frac{3x}{3} = \frac{1}{3}$

$x = \frac{1}{3}$

$x + 4 = 0$
-4 -4

$x = -4$

37. Solve: $0 = 6x^2 - 4x - 2$

$0 = (6x + 2)(x - 1)$

$6x + 2 = 0$
-2 -2

$\frac{6x}{6} = \frac{-2}{6}$

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

$x - 1 = 0$
+1 +1

$x = 1$

40. $x^2 - 9 = 0$

+9 +9

$x^2 = 9$
 $\sqrt{x^2} = \sqrt{9}$

$x = 3$

$x = -3$

41. $3x^2 - 12 = 0$

+12 +12

$\frac{3x^2}{3} = \frac{12}{3}$

$x^2 = 4$
 $\sqrt{x^2} = \sqrt{4}$

$x = 2$ $x = -2$

35. $2x^2 + 3x = 2$

-2 -2

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

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

$2x - 1 = 0$
+1 +1

$\frac{2x}{2} = \frac{1}{2}$
 $x = \frac{1}{2}$

$x + 2 = 0$
-2 -2

$x = -2$

38. $6x^2 + 7x - 20 = 0$

$(3x - 4)(2x + 5) = 0$

$3x - 4 = 0$
+4 +4

$\frac{3x}{3} = \frac{4}{3}$

$x = \frac{4}{3}$

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

$\frac{2x}{2} = \frac{-5}{2}$

$x = -\frac{5}{2}$

42. $2x^2 - 18 = 0$

+18 +18

$\frac{2x^2}{2} = \frac{18}{2}$

$x^2 = 9$
 $\sqrt{x^2} = \sqrt{9}$

$x = 3$ $x = -3$

36. $x^2 - 4 = x + 8$

-x -8 -x -8

$x^2 - x - 12 = 0$

$(x - 4)(x + 3) = 0$

$x - 4 = 0$
+4 +4

$x = 4$

$x + 3 = 0$
-3 -3

$x = -3$

39. $x^2 + 6x + 8 = 0$

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

$x + 4 = 0$
-4 -4

$x = -4$

$x + 2 = 0$
-2 -2

$x = -2$

43. $k^2 - 196 = 0$

+196 +196

$k^2 = 196$
 $\sqrt{k^2} = \sqrt{196}$

$k = 14$

$k = -14$

Unit 9: Radical Expressions

Simplify.

44. $3\sqrt{18} - 2\sqrt{32}$

$3\sqrt{9}\sqrt{2} - 2\sqrt{16}\sqrt{2}$

$3 \cdot 3\sqrt{2} - 2 \cdot 4\sqrt{2}$

$9\sqrt{2} - 8\sqrt{2}$

$1\sqrt{2}$

47. $\sqrt{75x^2} \cdot \sqrt{3x^3}$

$\sqrt{225x^5}$

$15\sqrt{x^4}\sqrt{x}$

$15x^2\sqrt{x}$

45. $\sqrt{x^4y^3} \cdot \sqrt{8x^3y}$

$\sqrt{8x^7y^4}$

$\sqrt{4}\sqrt{2}\sqrt{x^6}\sqrt{x} \cdot y^2$

$2x^3y^2\sqrt{2x}$

46. $\sqrt{75} + \sqrt{3}$

$\sqrt{25}\sqrt{3} + \sqrt{3}$

$5\sqrt{3} + \sqrt{3}$

$6\sqrt{3}$

48. $\sqrt{8} + \sqrt{2}$

$\sqrt{4}\sqrt{2} + \sqrt{2}$

$2\sqrt{2} + \sqrt{2}$

$3\sqrt{2}$

49. $\sqrt{8x^2} \cdot \sqrt{2x^2}$

$\sqrt{16x^4}$

$4x^2$

50. $\sqrt{300}$

$$\frac{\sqrt{100\sqrt{3}}}{10\sqrt{3}}$$

51. $-\frac{\sqrt{18}}{\sqrt{12}}$

$$-\frac{\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-\sqrt{6}}{2}$$

52. $\sqrt{80}$

$$\frac{\sqrt{16\sqrt{5}}}{4\sqrt{5}}$$

53. $\frac{+3\sqrt{14x^2}}{+21x}$

$$= \frac{3\sqrt{2x^2}}{\sqrt{3}} = \frac{3x\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{3x\sqrt{6}}{3} = \boxed{x\sqrt{6}}$$

54. $-\frac{\sqrt{8c}}{\sqrt{480c^3}}$

$$= \frac{-1}{3c}$$

55. $\frac{\sqrt{13f^3}}{\sqrt{5f^2}}$

$$= \frac{\sqrt{65f}}{5}$$

Unit 10: Rational Expressions

Simplify.

56. $\frac{4}{y^3} \cdot \frac{-3}{5y}$

$$\frac{-12}{5y^4}$$

57. $\frac{z-3}{3z} \cdot \frac{z+8}{z+2}$

$$\frac{(z-3)(z+8)}{3z(z+2)}$$

58. $\frac{x^2-4}{x+3} \cdot \frac{x^2+7x+12}{x-2}$

$$\frac{(x-2)(x+2)}{x+3} \cdot \frac{(x+4)(x+3)}{x-2}$$

$$\boxed{(x+2)(x+4)}$$

$$59. \frac{z+5}{z} \div \frac{3z+15}{4z}$$

$$\frac{z+5}{5} \cdot \frac{4z}{3z+15}$$

$$\frac{\cancel{z}+5}{5} \cdot \frac{4\cancel{z}}{3(\cancel{z}+5)} = \boxed{\frac{4z}{15}}$$

$$61. \frac{4}{t-3} - \frac{1}{t-2}$$

$$\frac{4t-8}{(t-3)(t-2)} - \frac{t-3}{(t-2)(t-3)}$$

$$\frac{4t-8-t+3}{(t-3)(t-2)} = \boxed{\frac{3t-5}{(t-3)(t-2)}}$$

$$63. \frac{m+6}{m^2-m-42}$$

$$\frac{\cancel{m}+6}{(\cancel{m}+6)(m-7)} = \boxed{\frac{1}{m-7}}$$

$$60. \frac{3}{5x^2} + \frac{5}{2x} \cdot 5x$$

$$\frac{6}{10x^2} + \frac{25x}{10x^2} = \boxed{\frac{6+25x}{10x^2}}$$

$$62. \frac{2x}{x-5} + \frac{9}{x+4}$$

$$\frac{2x^2+8x}{(x-5)(x+4)} + \frac{9x-45}{(x-5)(x+4)}$$

$$\boxed{\frac{2x^2+17x-45}{(x-5)(x+4)}}$$

$$64. \frac{m-2}{4-2m}$$

$$\frac{\cancel{m}-2}{2(2-\cancel{m})} = \boxed{-\frac{1}{2}}$$