Algebra 2B
Exam Review KEY

1. a. $a_1 = 3,\ a_n = 4(a_{n-1})$ b. $a_n = 3(4^{n-1})$ c. 805306368

   d. 1073741823

2. a. $a_1 = 1,\ a_n = a_{n-1} + 3$ b. $a_n = 1 + 3(n-1) = 3n - 2$ c. 178

   d. 5370

3. 4624.577 cm^3

4. 2805 seats

5. a. $17^{\frac{1}{3}}$ b. $x^{\frac{3}{4}}$

6. a. $\sqrt[3]{(-7)^4}$ or $\left(\sqrt[3]{-7}\right)^4$ b. $\sqrt[5]{x^2}$ or $\left(\sqrt[5]{x}\right)^2$

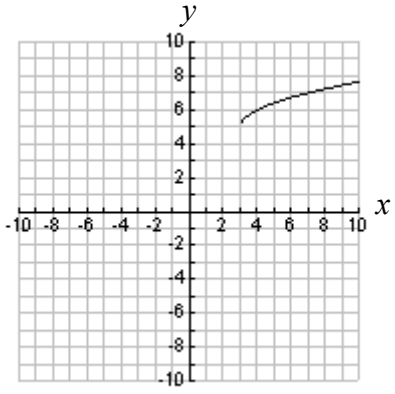
7. a. 81 b. $\frac{1}{9}$ c. $\frac{7}{3}$ d $2^7 = 128$

8. a. a^4b^9 b. $\frac{24}{x^{\frac{5}{6}}}$ c. $\frac{1}{x^{\frac{1}{15}}}$ d. $\frac{ab^3}{c^{\frac{5}{2}}}$

   e. $x^{\frac{3}{2}}$ f. $3x$ g. $2x^6$ h. $\frac{1}{x^{12}}$

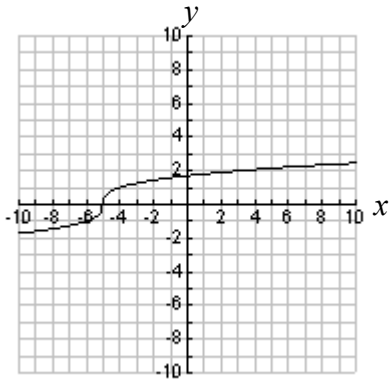
   i. $\frac{1}{2a}$

9. a. $y = \sqrt{x-3} + 5$



D: all real numbers greater than or equal to 3
R: all real numbers greater than or equal to 5

b. $y = \sqrt[3]{x+5}$



D: all real numbers
R: all real numbers

10. a. Reflect the graph of f about the y-axis, then translate 5 units to the right.

b. Translate the graph of f 8 units to the left and down 2 units.

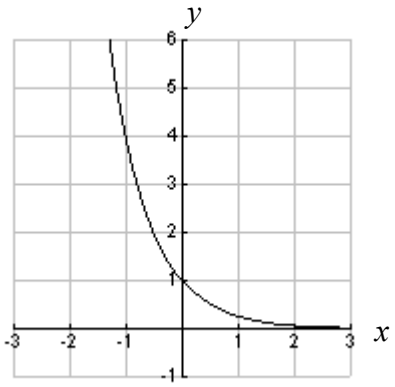
11. 9.2 seconds

12. 88.889 feet

13. a. $x = 16$ b. $x = 32$ c. Ø, or no solution
d. $x = -198$

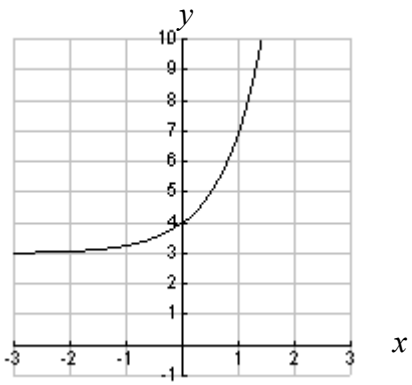
14. a. iii b. v c. i d. iv e. ii

15. a. $y = 4^{-x}$



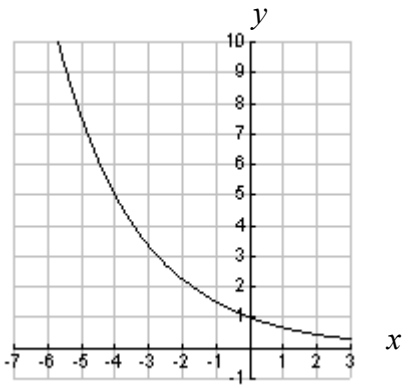
y-intercept: (0, 1)
asymptote: $y = 0$
D: all real numbers
R: all real numbers greater than 0
Function is decreasing

b. $y = 4^x + 3$



y-intercept: (0, 4)
asymptote: $y = 3$
D: all real numbers
R: all real numbers greater than 3
Function is increasing

c. $y = \left(\frac{2}{3}\right)^x$



y- intercept: (0, 1)
asymptote: $y = 0$
D: all real numbers
R: all real numbers greater than 0
Function is decreasing

16. In 1920, the population was approximately 8193.
In 1950, the population was approximately 17185.

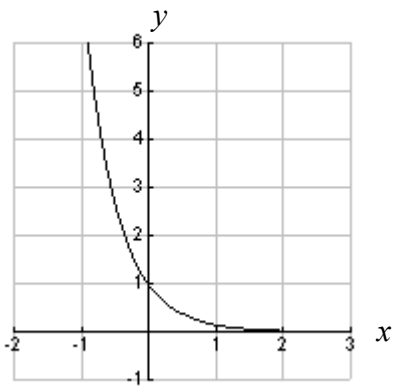
17. There will be \$7325.98 in the account after 5 years.

18. After 5 years the car will be worth \$17797.85. In *t* years, it will be worth $75000(0.75)^t$.

19. $P = 250000(0.95)^n$, where *P* is the population and *n* is the number of years.
In 10 years the population is about 149684.

20. There will be \$1558.93 in the account after 6 years.

21. a. $y = e^{-2x}$



y-intercept: (0, 1)
asymptote: $y = 0$
D: all real numbers
R: all real numbers greater than 0
Function is decreasing

22. At 5:00 PM there will be approximately 67225 bacteria present.
In 6.931 hours there will be over 120,000 bacteria present.

23. a. $10^{-4} = \dfrac{1}{10000}$ b. $6^x = 216$ c. $10^x = 5$ d. $e^m = 7$

24. a. $\log_{32} 16 = \dfrac{4}{5}$ b. $\ln 2 = 3x$ c. $\log 100000 = 5$

25 a. 4 b. 0 c. 2

26. a. x b. x c. x d. x

27. The functions $y = 7^x$ and $y = \log_7 x$ are inverses of each other.
The graph shows this since the graphs of the two functions are reflections of each other through the line $y = x$.

28. a. $x = 2.5$ b. $x = 12$ c. $x = \log 40 \approx 1.602$
d. $x = \ln 9 \approx 2.197$ e. $x = 2$ f. $x = e^3 \approx 20.086$
g. $x = 3$ h. $x = 32$ i. $x = 8$ j. $x = 7$

29. a. $y = 5(3)^x$

30. i. Exponential, $y = 4^x$ ii. Linear, $y = 10 + 5x$
iii. Logarithmic, $y = \log_2 x$ iv. Quadratic, $y = x^2$
v. Exponential, $y = 400\left(\dfrac{1}{2}\right)^x$ vi. Radical, $y = \sqrt{x}$

31. Exponential, $y = 50(3)^x$, 984150 bacteria present after 9 hours

32. a. ii b. iv c. iii d. i

33. a. iv b. iii c. v d. ii e. i

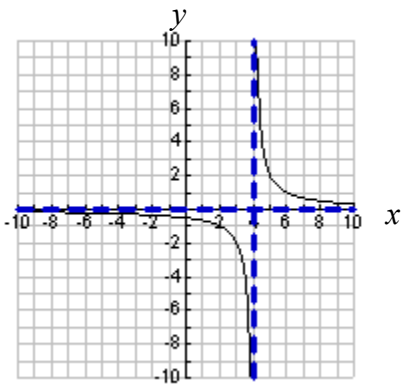
34. a. $s = kr$ b. $y = \frac{k}{x}$ c. $t = \frac{kr}{s}$

d. $V = krh$

35. $x = \frac{5}{4}$

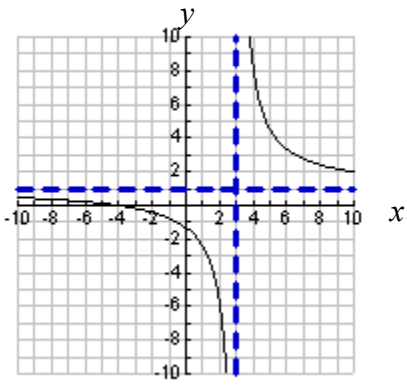
36. $t = \frac{k}{r}$, $k = 13800$ so $t = \frac{13800}{r}$ It will take 46 minutes with the faster pump.

37. a. $y = \frac{2}{x-4}$



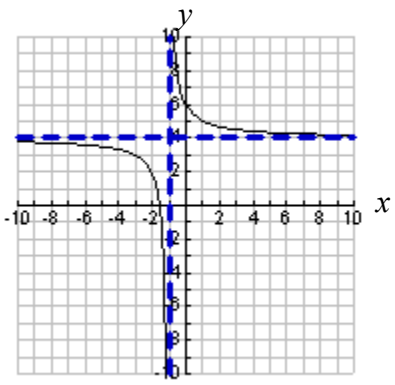
Horizontal asymptote: $y = 0$
Vertical asymptote: $x = 4$
D: all real numbers except 4
R: all real numbers except 0

b. $y = \frac{x+4}{x-3}$



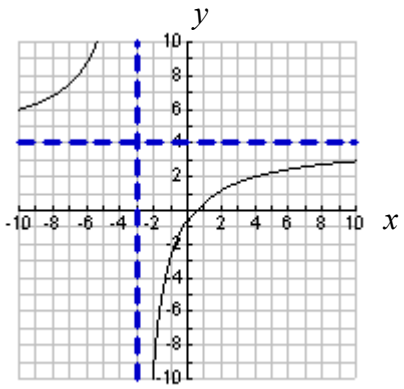
Horizontal asymptote: $y = 1$
Vertical asymptote: $x = 3$
D: all real numbers except 3
R: all real numbers except 1

c. $y = \frac{2}{x+1} + 4$



Horizontal asymptote: $y = 4$
Vertical asymptote $x = -1$
D: all real numbers except -1
R: all real numbers except 4

d. $y = \frac{4x-2}{x+3}$



Horizontal asymptote: $y = 4$
Vertical asymptote: $x = -3$
D: all real numbers except -3
R: all real numbers except 4

38. a. $x+5$ b. $\frac{1}{2(x+3)}$

39. a. $\frac{x^2+9x+25}{(x+5)(x+4)}$ or $\frac{x^2+9x+25}{x^2+9x+20}$ b. $\frac{-14x}{(2x+1)(x-3)}$ or $\frac{-14x}{2x^2-5x-3}$

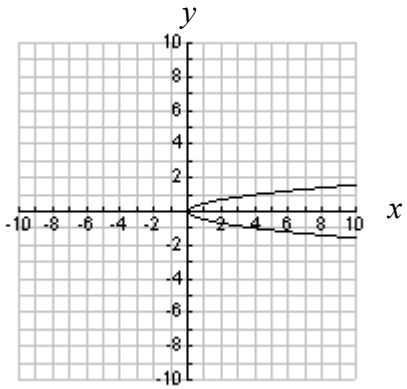
c. $\frac{x^2-12x}{15x+3}$

40. a. $x = \frac{5}{3}$ b. $x = 7$ or $x = -5$

41. a. iii b. i c. iv d. ii

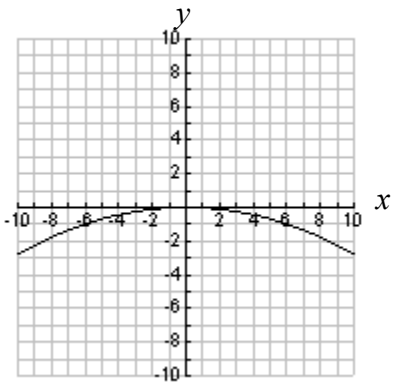
42. a. ellipse b. hyperbola c. circle d. parabola

43. a. $4y^2 = x$



Focus: (1/16, 0)
Directrix: $x = -1/16$

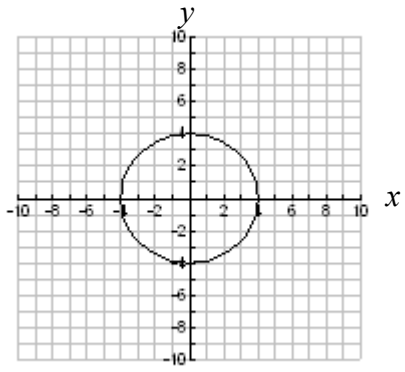
b. $x^2 + 36y = 0$



Focus: (0, -9)
Directrix: $y = 9$

44. $x^2 + y^2 = 25$

45.

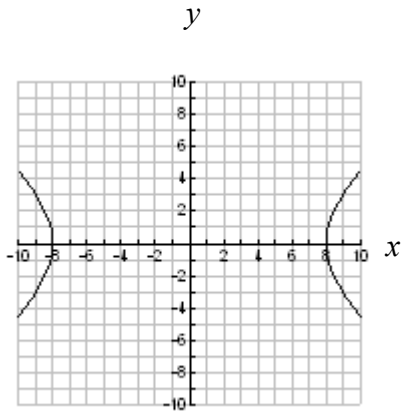


Center: (0, 0)
$r = 4$

46. $\frac{x^2}{64} + \frac{y^2}{100} = 1$

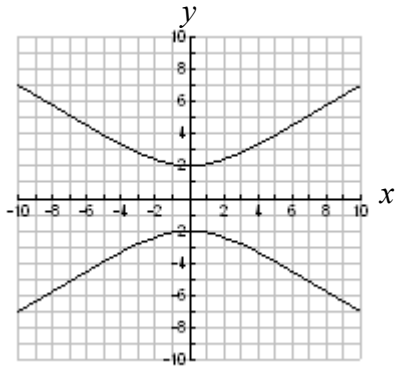
47. An ellipse with horizontal transverse axis, vertices at $(6,0)$ and $(-6,0)$, co-vertices at $(0,4)$ and $(0,-4)$

48. a.



Center: (0, 0)
Vertices: (–8, 0) and (8, 0)

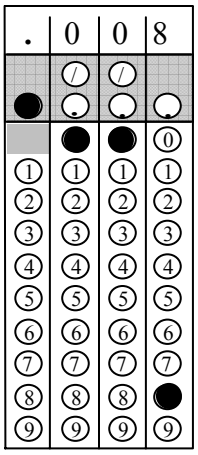
b.

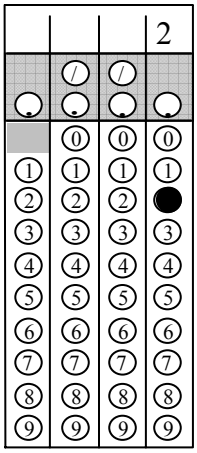


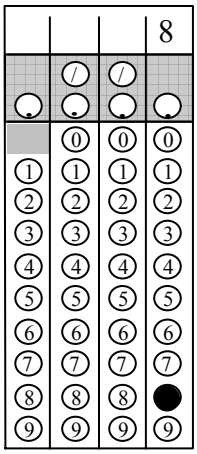
Center: (0, 0)
Vertices: $(0, 2)$ *and* $(0,-2)$

49. a. iii b. iv c. ii d. v e. i f vi

Practice Student Produced Response Questions

50 

51 

52 

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