

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

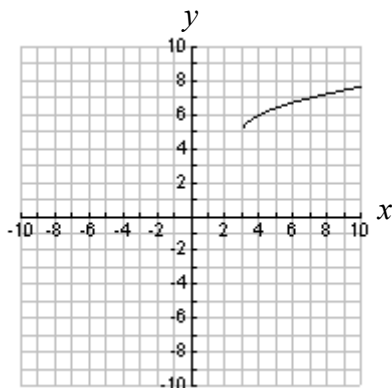
7. a. 81 b. $\frac{1}{9}$ c. $\frac{7}{3}$ d. $2^7 = 128$

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

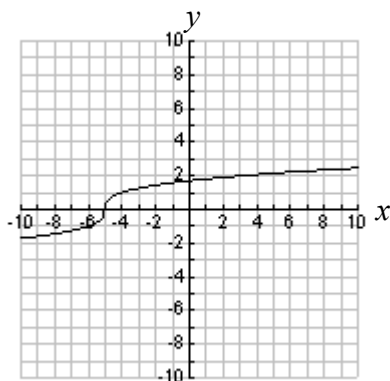
9. a. $y = \sqrt{x-3} + 5$



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 x -axis, then translate 5 units to the right.
 b. Translate the graph of f 8 units to the left and down 2 units.
 c. Reflect the graph of f about the y -axis, translate two units to the right and up 7 units OR translate two units to the left, translate 7 units up, and reflect over the y -axis

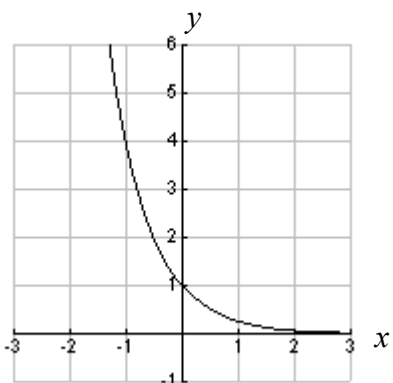
11. 9.2 seconds

12. 88.889 feet

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

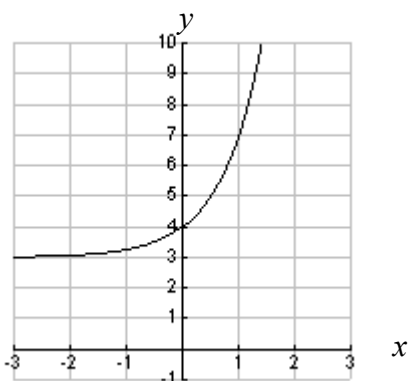
14. a. iii b. v c. i d. iv e. ii

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)

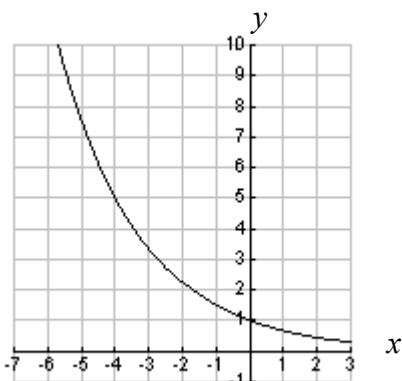
asymptote: $y = 3$

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: $y = 0$

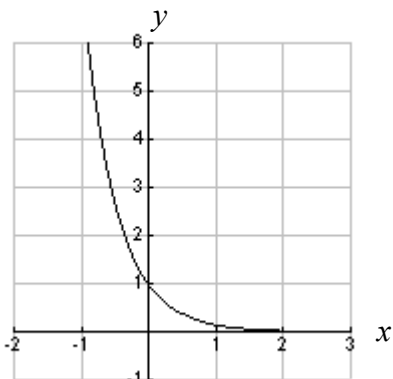
D: all real numbers

R: all real numbers greater than 0

Function is decreasing

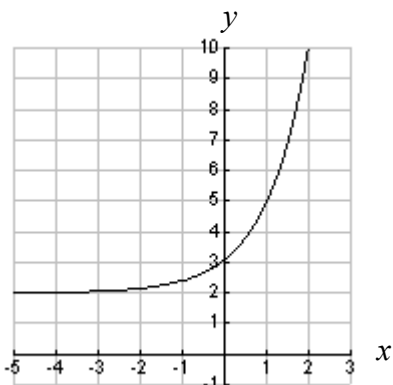
16. In 1920, the population was approximately 8193.
In 1950, the population was approximately 17185.
17. There will be \$7325.98 in the account after 5 years.
18. After 5 years the car will be worth \$17797.85. In t years, it will be worth $75000(0.75)^t$.
19. $P = 250000(0.95)^n$, where P is the population 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

b. $y = 3e^{x-1} + 2$



y-intercept: (0, 3.104)
 asymptote: $y = 2$
 D: all real numbers
 R: all real numbers greater than 2
 Function is increasing

22. At 5:00 PM there will be approximately 67,225 bacteria present.
 In 6.931 hours there will be over 120,000 bacteria present.

23. 0.125 or approximately 12.5% per year

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

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

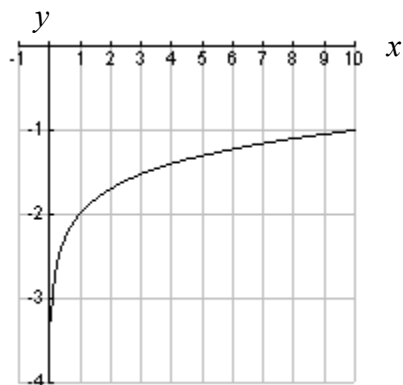
26. a. 4 b. 0 c. 2 d. $\frac{3}{2}$ e. $\frac{4}{3}$

27. a. x b. x c. x d. x e. $3x$ f. $4x$

28. The functions $y = 7^x$ and $y = \log_7 x$ are inverses of each other.

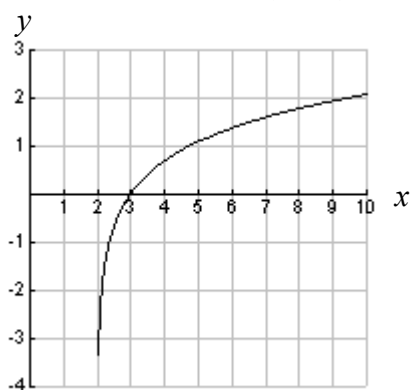
The graph shows this since the graphs of the two functions are reflections of each other through the line $y = x$.

29. a. $y = \log_{10}x - 2$



Vertical asymptote: $x = 0$
 D: all real numbers greater than 0
 R: all real numbers
 Function is increasing

b. $y = \ln(x - 2)$



Vertical asymptote: $x = 2$
 D: all real numbers greater than 2
 R: all real numbers
 Function is increasing

30. 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. $x = 7$
 k. $x = \frac{\log(21)+3}{2} \approx 2.161$ l. $x = 6$
 m. $x = -\frac{9}{4}$ n. $x = e^5 - 4 \approx 144.413$

31. a. $y = 5(3)^x$ b. $y = 4(5)^x$
 32. i. Exponential, $y = 4^x$ ii. Linear, $y = 10 + 5x$
 iii. Logarithmic, $y = \log_2 x$ iv. Quadratic, $y = x^2$
 v. Exponential, $y = 400\left(\frac{1}{2}\right)^x$ vi. Radical, $y = \sqrt{x}$

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

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

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

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

d. $V = krh$ e. $F = \frac{kmn}{v^2}$

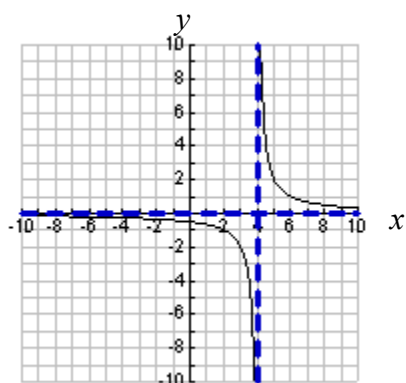
37. $x = \frac{5}{4}$

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

39. $y = 16.2$

40. $I = \frac{k}{d^2}$, $k = 575$ so $I = \frac{575}{d^2}$ The intensity will be approximately 13.610 lux.

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



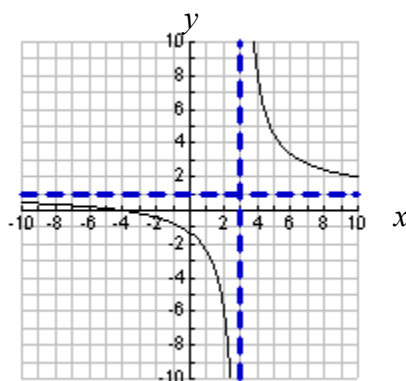
Horizontal asymptote: $y = 0$

Vertical asymptote: $x = 4$

D: all real numbers except 4

R: all real numbers except 0

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



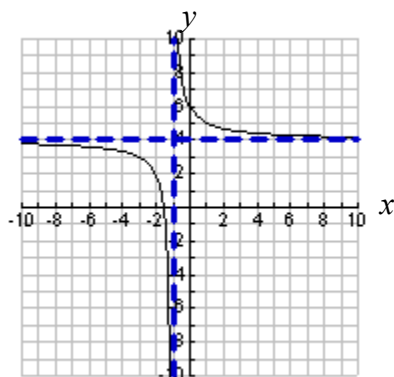
Horizontal asymptote: $y = 1$

Vertical asymptote: $x = 3$

D: all real numbers except 3

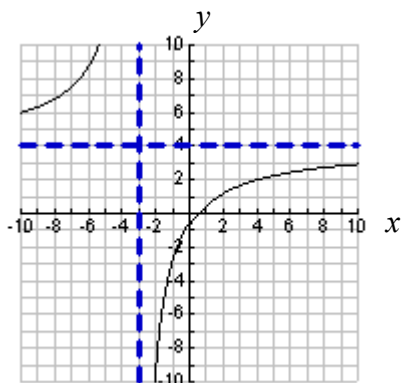
R: all real numbers except 1

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

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

43. 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 $\frac{-14x}{2x^2-5x-3}$

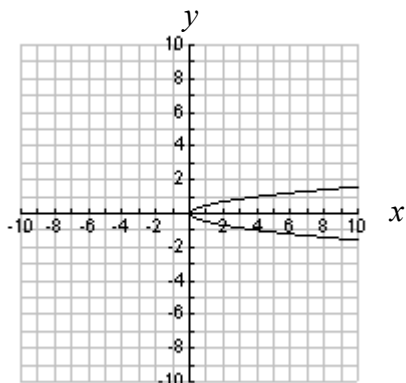
c. $\frac{x^2-12x}{15x+3}$ d. $\frac{7x+13}{(x+2)^2}$ or $\frac{7x+13}{(x+2)(x+2)}$ e. $\frac{7x^2-2x-104}{17x-12}$

44. a. $x = \frac{5}{3}$ b. $x = 7$ or $x = -5$ c. $x = -1$

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

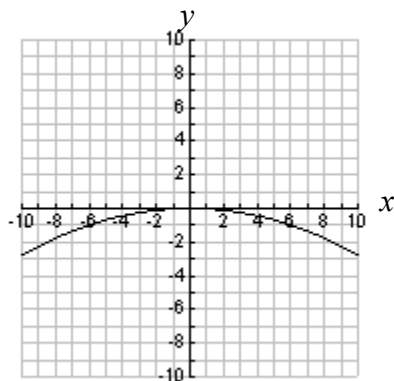
46. a. ellipse b. hyperbola c. circle d. parabola

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



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

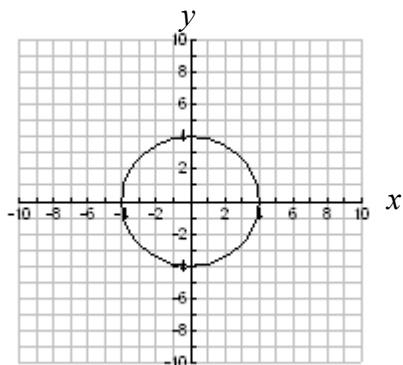
b. $x^2 + 36y = 0$



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

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

49.

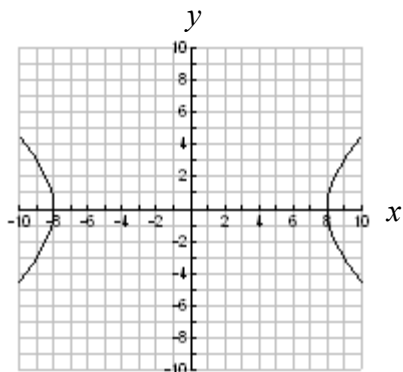


Center: (0, 0)
 $r = 4$

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

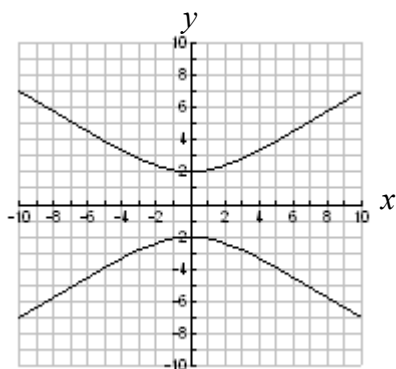
51. An ellipse with horizontal transverse axis, vertices at (6, 0) and (-6, 0), co-vertices at (0, 4) and (0, -4)

52. a.



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

52. b.



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

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

54. a. Parabola, focus $\left(\frac{1}{8}, 0\right)$, directrix $x = -\frac{1}{8}$, $y = 0$, opens to the right
 b. Hyperbola, vertices $(-5, 0)$ and $(5, 0)$, foci $(\pm\sqrt{89}, 0)$ or $(\pm 9.434, 0)$
 c. Circle, center $(0, 0)$, radius = 7
 d. Ellipse, vertices $(-11, 0)$ and $(11, 0)$, co-vertices $(0, -7)$ and $(0, 7)$, and foci $(-\sqrt{72}, 0)$ and $(\sqrt{72}, 0)$, or $(\pm 6\sqrt{2}, 0)$, or $(\pm 8.485, 0)$
55. a. Parabola, $x^2 = -4(y-3)$ b. Ellipse, $\frac{(x+1)^2}{9} + (y-1)^2 = 1$
 c. Circle, $(x-2)^2 + (y+4)^2 = 25$ d. Hyperbola, $\frac{(x-2)^2}{4} - \frac{(y-1)^2}{9} = 1$
56. a. iv b. i c. iii d. ii
57. a. $(-3, 0)$ and $(5, 2)$ b. $(1, 5), (1, -5), (-1, 5), (-1, -5)$

Practice Student Produced Response Questions

58

.	0	0	8
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	<input checked="" type="radio"/>
⑨	⑨	⑨	⑨

59

			2
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
①	①	①	①
②	②	②	<input checked="" type="radio"/>
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

60

			8
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	<input checked="" type="radio"/>
⑨	⑨	⑨	⑨

61

			5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	<input checked="" type="radio"/>
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨