hw solutions
section 5.1

1. evaluate:

(a) $4^{-3} \cdot 4^5 = 4^2 = 16$

(b) $3^{-3} \cdot 3^6 = 3^3 = 27$

4. evaluate:

(a) $[(-1/2)^3]^{-2} = (-1/8)^{-2} = (-8)^2 = 64$

(b) $[(-1/3)^2]^{-3} = [1/9]^{-3} = 9^3 = 729$

9. simplify:

(a) $(64x^9)^{1/3} = 4x^3$

(b) $(25x^3y^4)^{1/2} = 5x^{3/2}y^2$

13. simplify:

(a) $(2x^3y^2)^3 = 2^3x^9y^6 = 8x^9y^6$

(b) $(4x^2y^2z^3)^2 = 4^2x^4y^4z^6 = 16x^4y^4z^6$

16. simplify:

(a) $\dfrac{(a^m \cdot a^{-n})^{-2}}{(a^{m+n})^2} = \dfrac{a^{-2m+2n}}{a^{2m+2n}} = \dfrac{1}{a^{2m+2n+2m-2n}}$

$= \dfrac{1}{a^{4m}}$

(b) $\left(\dfrac{x^{2n-2}y^{2n}}{x^{5n+1}y^{-n}}\right)^{1/3} = \left(\dfrac{y^{2n}y^{n}}{x^{5n+1}x^{-2n+2}}\right)^{1/3}$

$= \left(\dfrac{y^{3n}}{x^{3n+3}}\right)^{1/3} = \dfrac{y^n}{x^{n+1}}$

17. solve for x: $6^{2x} = 6^4$

$2x = 4$

$x = 2$

24. solve for x: $3^{x-x^2} = 1/9^x$

$3^{x-x^2} = 9^{-x} = 3^{-2x}$

$x - x^2 = -2x$

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

$x = 0, 3$

25. solve for x: $3^{2x} - 12 \cdot 3^x + 27 = 0$

$(3^x)^2 - 12(3^x) + 27 = 0$

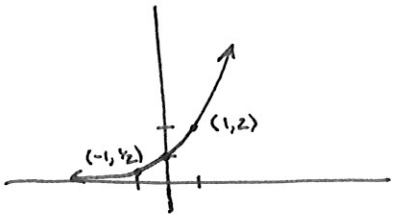
$(3^x - 3)(3^x - 9) = 0$

$3^x = 3$ or $3^x = 9$

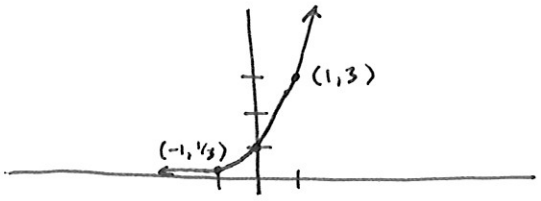
$x = 1$ $\quad x = 2$

27. sketch the graphs:

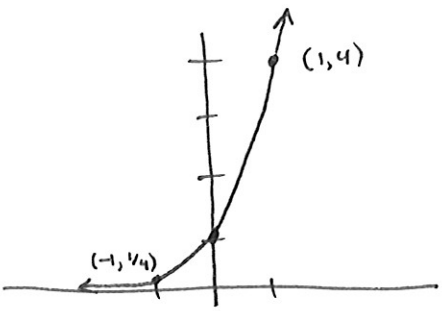
$y = 2^x$



$y = 3^x$



$y = 4^x$



37. $f(x) = Ae^{kx}$, $f(0) = 100$, $f(1) = 120$

find f.

$f(0) = Ae^{k \cdot 0} = A$

$A = 100$

$f(1) = 100e^{k(1)} = 100e^k$

$120 = 100e^k$

$1.2 = e^k$

$\ln(1.2) = k$

$f(x) = 100e^{\ln(1.2)x}$

OR $= 100(1.2)^x$