Review: Exponential Functions

p.267 # 2-8, 11-17
Handout (ignore references to old text questions)

8 df
6
7 bce

6. $\sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$, $a>0, b>0$

$LS = (a+b)^{\frac{1}{2}}$ $RS = a^{\frac{1}{2}} + b^{\frac{1}{2}}$

order of ops requires
① $a+b$
② $(\ )^{\frac{1}{2}}$

① $(\ )^{\frac{1}{2}}$, $(\ )^{\frac{1}{2}}$
② addition

$LS = (a+b)^{\frac{1}{2}}$ $RS = \sqrt{a} + \sqrt{b}$

$LS^2 = \left[(a+b)^{\frac{1}{2}}\right]^2$ $RS^2 = \left(\sqrt{a} + \sqrt{b}\right)^2$

$= a+b$ $= a + 2\sqrt{a}\sqrt{b} + b$

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7(b) $\dfrac{8m^{-5}}{(2m)^{-3}} = \dfrac{8m^{-5}}{2^{-3}m^{-3}}$

$= \dfrac{2^3 m^{-5}}{2^{-3} m^{-3}}$

$= 2^6 m^{-2}$

$= \dfrac{64}{m^2}$

Set $m=4$ $= \dfrac{64}{(4)^2}$

$= 4$

$(ab)^x = a^x b^x$

$x^{-\frac{4}{5}} = \dfrac{1}{\left(\sqrt[5]{x}\right)^4}$

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7(c) $\dfrac{2w(3w^{-2})}{(2w)^2} = \dfrac{\cancel{3}6w^{-1}}{\cancel{2}4w^2}$

$= \dfrac{3w^{-3}}{2}$

$= \dfrac{3}{2w^3}$

(e) $\left(6(x^{-4})^3\right)^{-1} = \left(6x^{-12}\right)^{-1}$

$= 6^{-1}x^{12}$

$= \dfrac{x^{12}}{6}$

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8 1f

(d) $\dfrac{\sqrt[4]{x^{-16}(x^6)^{-6}}}{(x^4)^{-\frac{11}{2}}} = \dfrac{\sqrt[4]{x^{-16}x^{-36}}}{x^{4\left(-\frac{11}{2}\right)}}$

$= \dfrac{(x^{-52})^{\frac{1}{4}}}{x^{-22}}$

$= \dfrac{x^{-13}}{x^{-22}}$

$= x^{-13+22}$

$= x^9$

(f) $\dfrac{\sqrt{x^6(y^3)^{-2}}}{(x^3y)^{-2}} = \dfrac{\sqrt{x^6y^{-6}}}{x^{-6}y^{-2}}$

$= \dfrac{(x^6y^{-6})^{\frac{1}{2}}}{x^{-6}y^{-2}}$

$= \dfrac{x^3y^{-3}}{x^{-6}y^{-2}}$

$= \dfrac{x^9}{y}$

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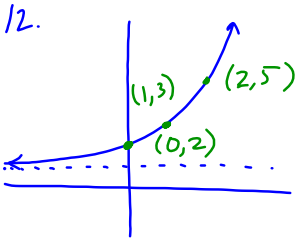
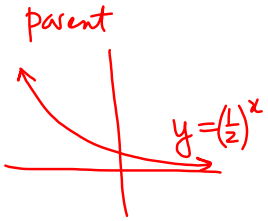
12.



① h. reflect
② v. shift up $q=1$



$y = a(b)^x + q$

$y = a(b)^x + 1$

$2 = ab^0 + 1$

$1 = a$

$y = b^x + 1$

Sub $(1,3)$

$3 = b^1 + 1$

$2 = b$

$y = 2^x + 1$

but ① h. reflect

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

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16 (b) $h = 4.5 \times 10^9$ yrs

HA: $y = 0$

Starting value, assume 100%.

$a = 1$

$$y = \left(\frac{1}{2}\right)^{\frac{t}{4.5 \times 10^9}}$$

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- exponent laws
  - > negative exponents, move between numerator, denominator
- rational exponents
  - > move between exponent and radical notation
- graphing
  - > domain, range, transformations
  - > manipulating equations to use only vertical transformations
- determining equations from graphs, points
  - > generally use vertical-only form of equation
- solving exponential equations
  - > convert to same base
  - > guess & check
  - > patterns, change of variable, quadratics, restrictions
- applications of exponential functions
  - > doubling period, half-life
  - > model (equations) from experimental data

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