Calc AB

Name Ky

Summer packet review #2.

Exponential functions: $f(x) = a^x$ (note: the variable is the exponent)

1. Complete the following rules for exponents:

$a^x \cdot a^y =$ a^{x+y}

$\frac{a^x}{a^y} =$ a^{x-y}

$(a^x)^y =$ a^{xy}

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

$\left(\frac{a}{b}\right)^x =$ $\frac{a^x}{b^x}$

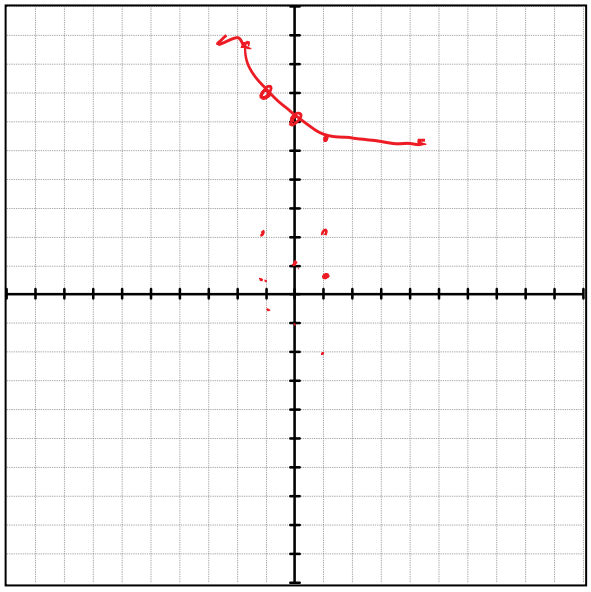
Remember that these rules can be used in either direction!!

(for example, $e^{2x} = (e^x)^2$, and $3^{x+2} = 9 \cdot 3^x$)

2. Sketch a graph of $f(x) = 5 + 2^{-x}$. State the domain and range of the function.

Domain $(-\infty, \infty)$

Range $(5, \infty)$



3. rewrite each of the following expressions using a base of 2:

a) 32^{3x}

$(2^5)^{3x}$

2^{15x}

b) $\left(\frac{1}{4}\right)^{3x}$

$(2^{-2})^{3x}$

$= 2^{-6x}$

Solve the given equations:

log won't be on the quiz

7. $\log_2(2x^2-4)=5$

$2^5 = 2x^2-4$

$36 = 2x^2$ $\quad 18 = x^2$ $\quad x = \pm\sqrt{18}$

8. $\ln(x+1)=2+\ln(x-1)$

$\ln(x+1)-\ln(x-1)=2$

$\ln\frac{x+1}{x-1}=2$

$e^2 = \frac{x+1}{x-1}$

$e^2x - e^2 = x+1$

$e^2x - x = 1+e^2$

$x(e^2-1) = 1+e^2$

$x = \frac{1+e^2}{e^2-1}$

9. a. state the domain and range of $y=\log_2 x$ in interval notation:

D: $(0,\infty)$

R: $(-\infty,\infty)$

b. Find the inverse of the function given in (a) and state the domain and range in interval notation.

$x = \log_2 y$ $\qquad 2^x = y$

****** Highly recommend you look at the properties of logs in the summer review packet.**

State the Domain and Range, in interval notation, of the given function.

10. $y=|x|-2$

D: $(-\infty,\infty)$

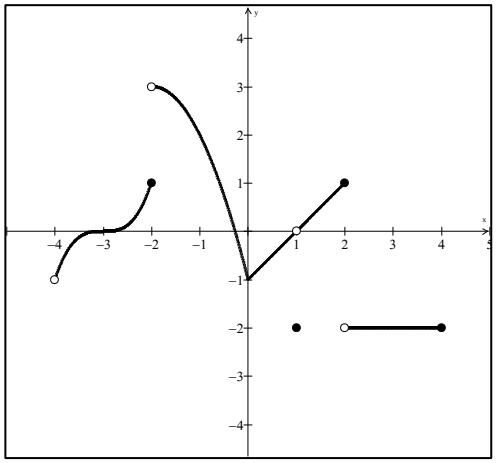
R: $[-2,\infty)$

11. $y=\sqrt{16-x^2}$

D: $[-4,4]$

R: $[0,4]$

12.



D: $(-4,4]$

R: $[-2] \cup [-1,3)$

13. Find the inverse of g(x) and f(x):

$f(x)=2-x^2$ *where* $x\le 0$ $\qquad g(x)=\sqrt{x+2}$

$x \ge -2$, $y \ge 0$

$x = \sqrt{y+2}$

$x^2 = y+2$

$g^{-1}(x) = x^2-2$ where $x \ge 0$

finding f^{-1}

$x = 2-y^2$

$x-2 = y^2$

$-x+2 = y^2$

$y = \pm\sqrt{-x+2}$

however $f(x)$ D: $x \le 0$

$\therefore f^{-1}$ Range $y \le 0$

so $f^{-1}(x) = -\sqrt{-x+2}$