Quiz 3

Name(s):

Show *all* your work. Reasonable supporting work must be shown for any partial credit.

(top right handwritten:) $x^3 x^3 = (xxx)(xxx) = x^6$

1. [2] Simplify: $\left(\dfrac{-x^3}{2}\right)^2 (8x^{-2})$

(handwritten, blue:) activity

(handwritten work:)
$$\left(\frac{-x^3}{2}\right)\left(\frac{-x^3}{2}\right) \cdot 8\frac{1}{x^2} = \frac{+x^6}{4} \cdot \frac{8}{x^2} = \frac{8x^6}{4x^2} = \frac{4 \cdot 2 \; xxxxxx}{2 \; xx}$$

(circled +.5)   reexp (+.5)   (+1) $-2x^4$

2. [2] Find x given: $5 \cdot 2^x - 7 = 10$. (decimal or "exact" answers are both ok)

(handwritten, blue:) §3.4 #31

(handwritten work:)
$$\frac{5 \cdot 2^x = 17}{5}$$ $+7 \quad +7$

$$2^x = \frac{17}{5} \rightarrow \log_2\left(\frac{17}{5}\right) = x$$

order of op (+1)   log use (+.5) $\ln 2^x = \ln \frac{17}{5}$ get it (+.5)

$$x = \left(\ln \frac{17}{5}\right)/(\ln 2)$$

3. Let f be the logarithmic function that has been horizontally shifted & graphed below.
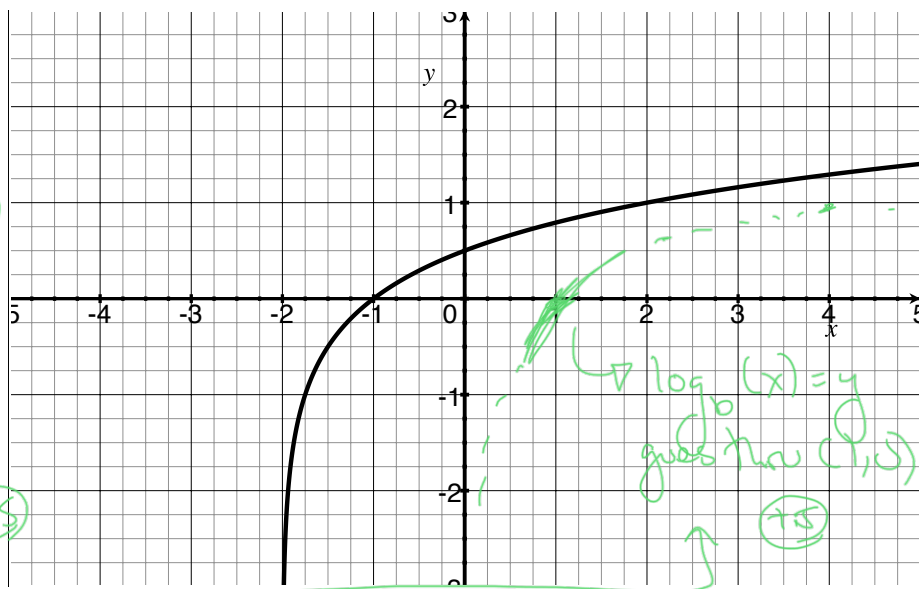
(a) [1] Estimate $f(-1)$.

(handwritten:) 0 (+1)

(b) [1] What is the domain of f?

(handwritten, blue:) wooohu7 #20

(handwritten, green:) inputs/x values (+.5)

$(-2, \infty)$ (+.5)

(c) [1] Describe how the graph of? $f(x)$ can be obtained from the graph of a basic logarithmic function.

(handwritten, blue:) wooohu7 #21

(handwritten, green:) Shift left 2 units (+.5) b/c

(on graph handwritten:) $\log_b(x) = y$ guess thru (1,0) (+.5)

(d) [3] Find the algebraic rule for the function f.

(handwritten, orange:) looks like $y = \log_b(x+h)$ (+.5)

(handwritten, blue:) §3.2 #12   graph goes thru $(-1, 0)$ (+.5)

so $0 = \log_b(-1+h)$
$\Rightarrow b^0 = -1+h$
$+1 \quad +1$
$\Rightarrow 2 = h$ (+.5)

(handwritten, orange:) horiz shift left 2 corresponds with adding 2 inside parentheses

$\Rightarrow y = \log_b(x+2)$

(handwritten, purple:) graph goes thru $(2,1)$ plug in (+.5)
so $1 = \log_b(2+2)$
$\Rightarrow 1 = \log_b(4)$ get b exp (+.5)
$\Rightarrow b^1 = 4$ (+.5)
So $y = \log_4(x+2)$

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