

Quiz 3

Key

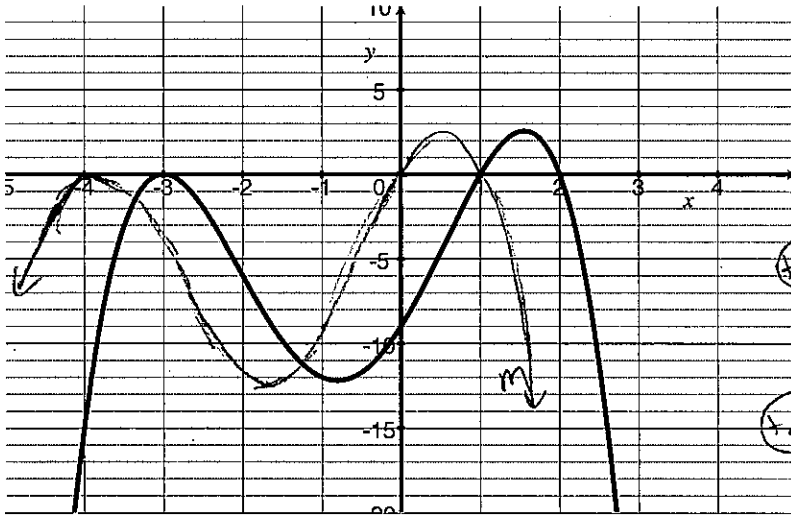
Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [1] (Polynomial Wks #1) Explain what the degree of a polynomial is in your own words. Hint: make sure you *use* words!

The degree of a polynomial is the highest exponent appearing on an x (with a non-zero coefficient).

or
The largest number that appears 'in the sky' behind an x .

2. The graph of f has integer x and y intercepts and is shown below.



both ends point in the same direction $\Rightarrow f$ has even degree

The graph touches but does not cross at $x = -3$ \Rightarrow the factor $(x - (-3))$ of f has an even multiplicity i.e. $(x + 3)^2$ is a factor.

- (a) [2] (§2.3 #39) Find the equation of the lowest degree for f .

-3 is a root $\Rightarrow (x + 3)$ is a factor
 -1 is a root $\Rightarrow (x + 1)$ is a factor
 2 is a root $\Rightarrow (x - 2)$ is a factor
 So $a(x + 3)^2(x + 1)(x - 2) = f(x)$

- (b) [2] (Polynomial Wks #11) Given that $m(x) = f(x + 1)$, graph m .

corresponds to a horizontal shift left 1 unit

\downarrow
+1.5

\downarrow
+1.5

do \uparrow +1

1

passes thru $(0, 9)$
 So $a(0 + 3)^2(0 + 1)(0 - 2) = 9$
 $\Rightarrow a(-18) = 9$
 $\Rightarrow a = -\frac{1}{2}$
 So $-\frac{1}{2}(x + 3)^2(x + 1)(x - 2)$

3. [3] (§3.2 #47) Solve for x by writing exponential equation into logarithmic one.

$$\log_{16} \sqrt{x-1} = \frac{1}{4}$$

$\log_b a = x$
exactly when
 $b^x = a$ } (4.5)

(+1) $16^{1/4} = \sqrt{x-1}$

$2 = \sqrt{x-1}$

alg
(+1)
rationalization
(+5)

$4 = x-1$

$5 = x$

Check

$\log_{16} \sqrt{5-1}$
 $= \log_{16} \sqrt{4}$

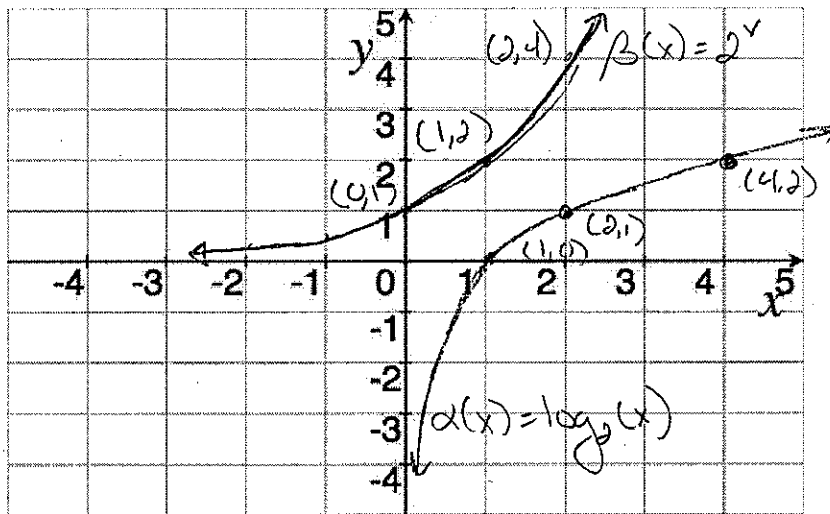
$= \log_{16} 2$

where

$16^{1/4} = 2 \checkmark$

4. [2] (Lecture)

Draw the graphs of
 $\alpha(x) = \log_2(x)$ and
 $\beta(x) = 2^x$ on the axes
provided. Label each.



shape of α (+5)
got + (1.5)

shape of β (+5)
got + (1.5)

Recall that $\log_b x = y$ and $2^x = y$
are inverses?