AGS 2 Module 3 Test Review **Name:** Key

An exponential function is a function where a quantity grows or decays at a constant rate.

The explicit equation of an exponential function is given by: $y = ab^x$
Where **b** is the *rate* and **a** is the *y-intercept*
In function Notation: $f(n) = ab^n$

1:

n	0	1	2	3	4	5
f(n)	4	8	16	32	64	128

×2 ×2 ×2

a) Is this an example of exponential function? Why or why not?
Yes, constant multiplier

b) Write an explicit formula for the function. $f(x) = 4(2)^x$

c) Find f(10) $f(10) = 4(2)^{10} = 4(1024) = 4096$

2:

$2(3)^{1/2}$ $2(3)^{3/2}$ $2(3)^{5/2}$

n	0	1/2	1	3/2	2	5/2	3
H(n)	2	3.464	6	10.392	18	31.177	54

×3 ×3

a) Fill in the table and write an equation.
$Y = 2(3)^x$

3: Clarita deposited $300 in a bank earning 5% interest rate. Fill in the rest of the table and write an equation. $300(1.05)^x$

Time (years)	0	1	2	3	4	5	6
Balance	300	315	330.753	347.29	364.65	382.88	402.03

4:

Write equations for the following situations.

a) Tammy deposits $400 in an account earning 2.5% interest annually.

$400(1.025)^x$

b) Tim deposits $200 in an account earning 3.15% interest annually. Write an expression for Tim's account balance after 6 months.

$200(1.0315)^{6/12}$

c) Julia deposits $1200 in an account earning 4.15% interest annually. Write an expression for Julia's account balance after 7 months.

$1200(1.0415)^{7/12}$

d) Gina deposits $800 in an account paying 1.45% interest annually.

$800(1.0145)^x$

5:

a) $\sqrt{24} = \sqrt{6 \cdot 4} = \sqrt{3 \cdot 2 \cdot 2 \cdot 2} = \sqrt{3 \cdot 2 \cdot 2^2} = 2\sqrt{6}$

b) $\sqrt[3]{108} = \sqrt[3]{2 \cdot 54} = \sqrt[3]{2 \cdot 2 \cdot 27} = \sqrt[3]{2 \cdot 2 \cdot 3 \cdot 9} = \sqrt[3]{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3} = \sqrt[3]{2^2 \cdot 3^3} = 3\sqrt[3]{4}$

c) $\sqrt{50} = \sqrt{5 \cdot 10} = \sqrt{5 \cdot 5 \cdot 2} = \sqrt{5^2 \cdot 2} = 5\sqrt{2}$

d) $\sqrt[3]{250} = \sqrt[3]{2 \cdot 125} = \sqrt[3]{2 \cdot 5 \cdot 25} = \sqrt[3]{2 \cdot 5 \cdot 5 \cdot 5} = \sqrt[3]{2 \cdot 5^3} = 5\sqrt[3]{2}$

e) $\sqrt[4]{80} = \sqrt[4]{10 \cdot 8} = \sqrt[4]{2 \cdot 5 \cdot 2 \cdot 4} = \sqrt[4]{2 \cdot 5 \cdot 2 \cdot 2 \cdot 2} = \sqrt[4]{5 \cdot 2^4} = 2\sqrt[4]{5}$

f) $\frac{x^3y^5}{2x^2} = \frac{xy^5}{2}$

g) $\frac{(b^3)^4}{b^2} = \frac{b^{12}}{b^2} = b^{10}$

h) $z^3 \cdot z^4 \cdot (z^2)^3 = z^3 \cdot z^4 \cdot z^6 = z^{13}$

6:

a) Write an expression that is equivalent (equal) to $4 \cdot 2^3$ $4 \cdot 2 \cdot 2^2$

b) Write an expression equivalent to $3^3 \cdot 2^5$ $3^2 \cdot 3 \cdot 2^3 \cdot 2^2$

c) Which is **not** equivalent to $\frac{b^x}{b^y}$

1) $b^x - b^y$ 2) b^{x-y} 3) $b^x b^{-y}$ 4) $b^x \left(\frac{1}{b}\right)^y$

d) ~~Which~~ is equivalent to 4^{x-1}

1) $\frac{4^x}{4}$ 2) $4(4^{x+2})$ $4(4^x 4^2)$ 3) $\frac{4}{4^x}$ $4 \cdot 4^{-x}$ 4) ~~$4^x - 4$~~

7:

a) If $f(x) = x^{\frac{2}{3}}$, what is $f(8)$? $f(8) = 8^{2/3} = \sqrt[3]{8^2} = \sqrt[3]{64} = \sqrt[3]{8 \cdot 8} =$

$\sqrt[3]{4 \cdot 2 \cdot 4 \cdot 2} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$

$= \sqrt[3]{2^3 \cdot 2^3} = 2 \cdot 2 = \boxed{4}$

b) If $f(x) = 4^x$, find when $f(x) = 1024$

$4^x = 1024$

$4^x = 4 \cdot 256$

$4^x = 4 \cdot 4 \cdot 64$

$4^x = 4 \cdot 4 \cdot 4 \cdot 16$

$4^x = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$

$4^x = 4^5$

$\boxed{x = 5}$

c) If $f(x) = 3 \cdot 2^x$, find when $f(x) = 48$

$3 \cdot 2^x = 48$

$2^x = 16$

$2^x = 2 \cdot 8$

$2^x = 2 \cdot 2 \cdot 4$

$2^x = 2 \cdot 2 \cdot 2 \cdot 2$

$2^x = 2^4$

$\boxed{x = 4}$

8:

a) Solve using the quadratic formula $2x^2 + 3x - 4 = 0$ $a=2$ $b=3$ $c=-4$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(-4)}}{2(2)}$$

$$= \frac{-3 \pm \sqrt{9 + 32}}{4}$$

$$= \frac{-3 \pm \sqrt{41}}{4}$$

b) Find the roots using factoring $x^2 + 2x - 8 = 0$

	x	-2
$+4$	$4x$	2

-8: 4, -2

$$(x-2)(x+4) = 0$$

$$x-2=0 \quad x+4=0$$

$$x=2 \quad x=-4$$

c) Solve using the quadratic formula and factoring $x^2 + 11x + 24$ $a=1$ $b=11$ $c=24$

$$x = \frac{-11 \pm \sqrt{11^2 - 4(1)(24)}}{2(1)}$$

$$x = \frac{-11 \pm \sqrt{121 - 96}}{2}$$

$$x = \frac{-11 \pm \sqrt{25}}{2}$$

$$x = \frac{-11 \pm \sqrt{5^2}}{2}$$

$$x = \frac{-11 \pm 5}{2}$$

$$x = \frac{-11+5}{2} = -3$$

$$x = \frac{-11-5}{2} = -8$$

	x	$+8$
$+3$	$3x$	24

24: 3, 8

$$(x+3)(x+8) = 0$$

$$x+3=0 \quad x+8=0$$

$$x=-3 \quad x=-8$$