Algebra 1

Name: WALSH - KEY

"Ticket out the Door" Content 10 Q's A Day SM

1) Determine whether the tables represent linear, exponential, or quadratic functions.

x	y
-8	-128
-7	-98
-6	-72
-5	-50
-4	-32

+30, +4, +26, +4, +22

Quadratic

x	y
1	-10
2	-20
3	-40
4	-80
5	-160

×2, ×2

Exponential

x	y
2	24
3	54
4	96
5	150
6	216

+30, +12, +42, +12, +54

Quadratic

x	y
3	18
4	32
5	50
6	72
7	98

+18, +4, +22, +4, +26

Quadratic

x	y
1	-6
2	-12
3	-24
4	-48
5	-96

×2, ×2, ×2

Exponential

x	y
-4	0
-3	2
-2	4
-1	6
0	8

+2, +2, +2, +2

Linear

$y = mx + b$

$y = 2x + 8$

x	y
1	5
2	9
3	13
4	17
5	21

+4, +4, +4

Linear

$y = mx + b$

$y = 4x + 1$

x	y
1	0
2	-1
3	0
4	3
5	8

Quad.

$a(x-h)^2 + k$

$(x-2)^2 - 1$

x	y
1	3
2	9
3	27
4	81
5	243

×3, ×3, ×3

Exponential

2) Write an equation to represent each table below.

Oven Temperature	
Time (min)	Temperature (° F)
0	375
1	325
2	275
3	225

-50

Linear

$y = -50x + 375$

E-mail forwarding	
Time (Days)	Number of People Who Received the E-mail
0	8
1	56
2	392
3	2744

×7

Exponential

$y = 8(7)^x$

x	-2	-1	0	1
y	0.08	0.4	2	10

×5 ×5

Exponential

$y = 2(5)^x$

x	-2	-1	0	1	2
y	-1	1	3	5	7

+2 +2

$y = 2x + 3$

3) Write an equation to represent each scenario below.

a) Joseph starts teaching karate; when his karate studio opens, there are 8 students enrolled. After 1 month, there are 11 students. After 2 months, there are 14 students. After 3 months, there are 17 students.

0 8
1 11
2 14
3 17

$y = 3x + 8$

b) There are currently 4 prairie dogs in a colony. Each year, the number of prairie dogs doubles.

$4(2)^x$

c) A taxi driver charges \$2.50 for the first mile and \$1.50 for each additional mile.

$1.50x + 2.50$

d) A culture of 6000 bacteria is reduced by 50% every hour.

$6000(1 - .50)^x$

e) A hot air balloon takes off at 5500 feet above sea level and rises 120 feet every minute.

$120x + 5500$

4) Which function below has the largest AROC over the interval $-2 \le x \le 3$?

a) $y = 40 \cdot 0.5^x$

(-2, 160)
(3, 5)
-31

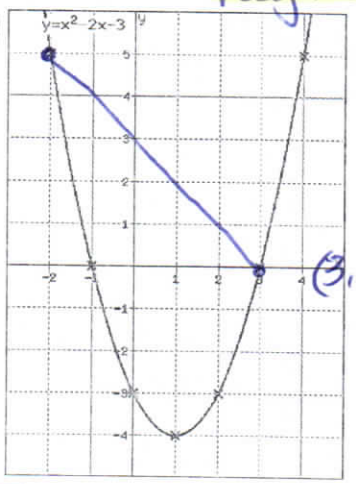
Largest # just in a neg. direction

c) A bank account starts with \$10. Each month, the amount of money doubles. $10(2)^x$

$(-2, \frac{5}{2})$
$(3, 80)$

$\frac{31}{2} = 15.5$

b)



$\frac{0-5}{3--2} = \frac{-5}{5} = -1$

d)

x	$f(x)$
-2	-4
-1	-1
0	2
1	5
2	8
3	11
4	14

$\frac{11--4}{3--2} = \frac{15}{5} = 3$

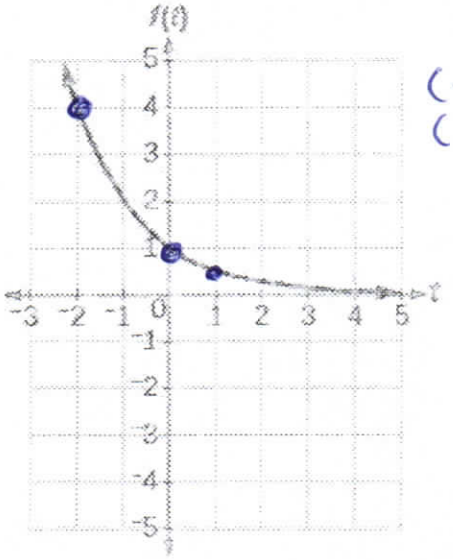
10) Given the functions below, which has the smallest value when x = 1?

$f(x) = 2 \cdot 3^x$ $\quad$ $g(x) = 5x - 1$ $\quad$ $h(x) = 2x^2 - x$

$2(3)^1$ $\quad$ $5(1) - 1$ $\quad$ $2(1)^2 - 1$

6 $\quad$ 4 $\quad$ 1

11) Find the rate of change between $x = -2$ and $x = 1$.



$(-2, 4)$ $\quad$ $(-2, 4)$

$(0, 1)$ $\quad$ $(1, .5)$

$\frac{-3.5}{3} = 1.167$

12) Find the y-intercept for each function below.

$f(x) = 2 \cdot 3^x$ $\quad$ $g(x) = 5x - 1$ $\quad$ $h(x) = 2x^2 - x$

$f(x) = a(b)^x$ $\quad$ $g(x) = mx + b$ $\quad$ $2(0)^2 - 0$

y int $\quad$ y int $\quad$ 0

$h(x) = ax^2 + bx + c$ (y int)

13) For the word problems below, determine whether they represent a linear or exponential function, then write the equation for the function it represents.

a) A science experiment involves periodically measuring the number of mold cells present on a piece of bread. At the start of the experiment, there are 50 mold cells. At the first observation, there are 150 mold cells. At the second observation, there are 450 mold cells.

0 50
1 150
2 450

Exponential $50(3)^x$

b) There are \$30 in my wallet. Each month, I add \$5 to my wallet.

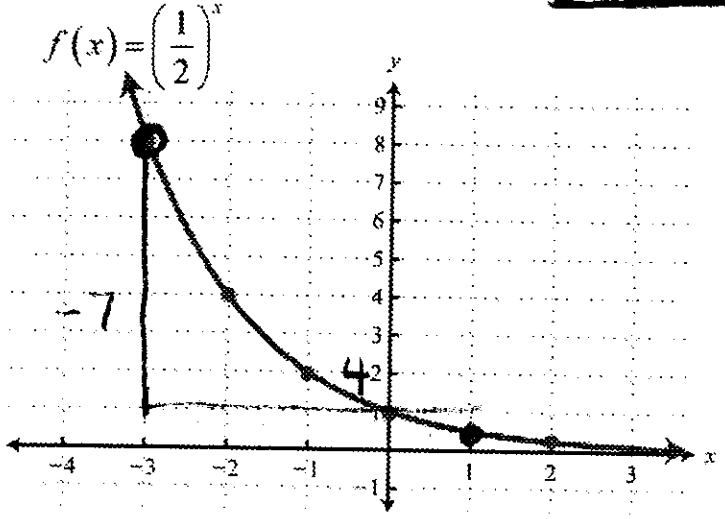
Linear $5x + 30$

c) There is \$100 in your bank account. Each month, you get 5% interest added to your account.

Exponential $100(1 + .05)^x$

Slope

9) Using the function below, find the average rate of change between $x = -3$ and $x = 1$.



a) -3

(b) $-\frac{7}{3}$

c) -2

d) $-\frac{1}{2}$

10) Given the parent functions f(x) = 3^x, g(x) = x^2, and h(x) = x, which function is **greatest** at x = 2?

(a) f(x) 9 b) g(x) 4 c) h(x) 2 d) none of these

11) In science class, your "egg drop" drops a total of 12 feet the first second, a total of 24 feet the next second, a total of 36 feet the third second, and so on. What type of function is this?

(a) Linear +12 b) Quadratic c) Exponential d) None

1	12
2	24
3	36

12) Decide whether the input-output data displayed in the table above indicates a linear or exponential relationship and write an equation to model the relationship.

x	f(x)
-1	-1
0	2
1	5
2	8
3	11

a) Linear: $f(x) = 2x + 3$

(b) Linear: $f(x) = 3x + 2$

~~c)~~ Exponential: $f(x) = 2^x$

~~d)~~ Exponential: $f(x) = 2 \cdot 3^x$

13) Find the **y-intercept** for the function below.

Vertex form
y int is not present

$$y = (x-4)^2 + 6$$

a) (0, -10) b) (0, 6) c) (0, 10) d) (0, 22)

y int → x = 0

$y = (0-4)^2 + 6$
$= (-4)^2 + 6$
$= 16 + 6$

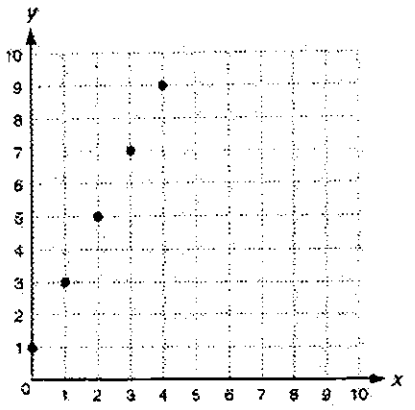
14) Kurtis is collecting mice for a science experiment. On the first day, he collects 1 mouse. On the second day, he collects 2 mice. On the third day, he collects 4 mice. On the fourth day, he collects 8 mice. He continues to collect mice at this rate for a total of 10 days. What type of function is this?

a) Linear b) Quadratic c) Exponential d) None

r = x2

1	1
2	2
3	4
4	8

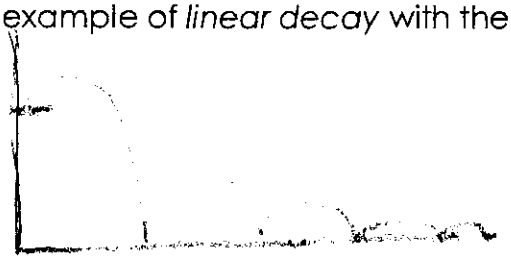
15) Which kind of model best describes the data graphed below?



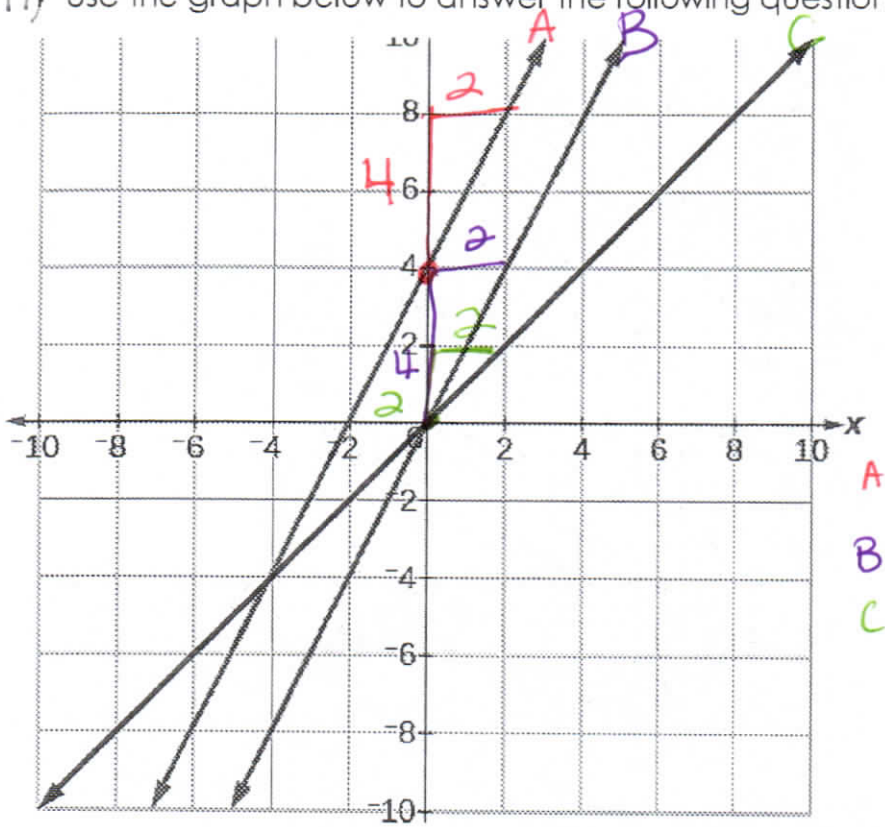
a) linear
b) quadratic
c) exponential
d) none of these

16) The change in the height of a ball from one bounce to the next if the ball is dropped from a height of 12 feet is 75% of its previous height. Which of the following is true?

a. This is an example of *exponential growth* with the growth factor being 1.75.
b. This is an example of *exponential decay* with the decay factor being .75.
c. This is an example of *linear growth* with the rate of change being .75.
d. This is an example of *linear decay* with the rate of change being -.75.



17) Use the graph below to answer the following questions.



a) Which function has the largest y-intercept?

A (0, 4)

b) Which function has the largest rate of change?

A) 2 * Largest

B) 2 *

C) 1

18) Write an equation to model the function in the table below.

0 1 2

Time (minutes)	3	4	5	6
Problems Left	17	14	11	8

26 23 20

+3 −3

Linear

$y = mx + b$

$y = -3x + 26$

19) Which of the functions below has a larger y-intercept? Which of the functions below has a larger rate of change?

$f(x) = \frac{2}{3}x - 6$

.67

x	g(x)
−4	10
0	7
4	4
8	1

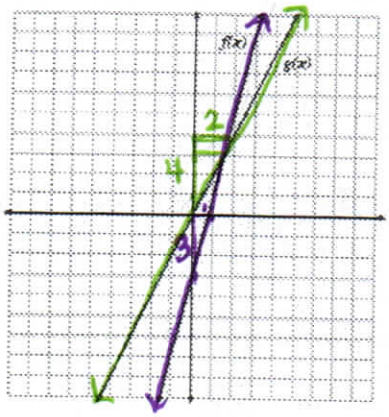
← g(x) has larger y int

$\frac{4-7}{4-0} = \frac{-3}{4} = -0.75$ ← greater ROC

* SIGN DOES NOT MATTER*

→ when comparing the sign only tells us the direction

20) Which of the following functions has a **greater** rate of change?



a) Function f(x) 3

b) Function g(x) 2

c) Their rates of change are the same

21) Which type of function has a **constant** rate of change?

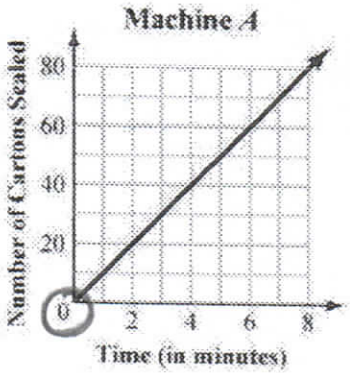
a) Linear b) Quadratic c) Exponential d) None

entire domain

22) Which type of function **always** has the greatest average rate of change overall.

a) Linear b) Quadratic c) Exponential d) None

23) Which function below has a **greater** y-intercept?



Machine B

Time (in minutes)	Number of Cartons Sealed
3	39
4	52
5	65
6	78

+13

2 26
1 13
0 0

a) Machine A's function

b) Machine B's function

c) Their y-intercepts are the same

24) Which type of function has a vertex?

a) Linear b) Quadratic c) Exponential d) None

25) A fitness center requires its customers to pay an initial membership fee of $50 plus a $3 usage fee each time they use the facilities. What type of function is this?

a) Linear b) Quadratic c) Exponential d) None

26) Using the function reprsented in the table below, find the average rate of change between $x = 1$ and $x = 4$.

x	$y = x^2$
0	0
1	1
2	4
3	9
4	16
5	25
6	36

a) −5

b) $\frac{5}{2}$

c) 3

d) 5

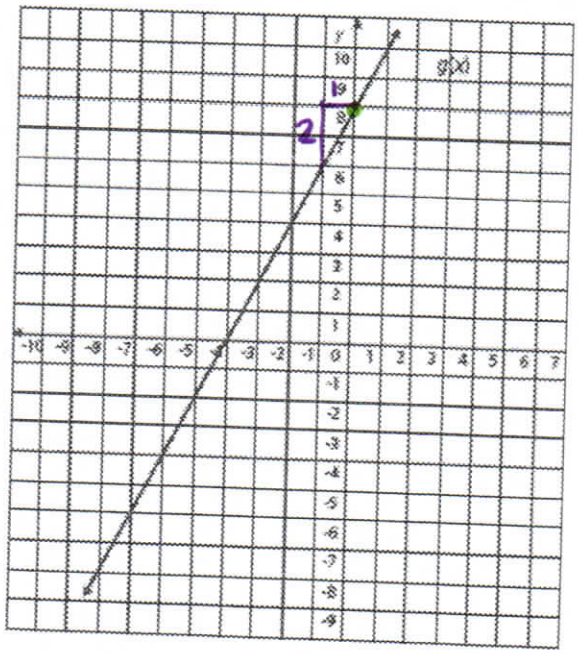
$\frac{16-1}{4-1} = \frac{15}{3}$

27) Compare and contrast the following functions.

a) Which function has the largest y-intercept? Explain. *(1 point)*

g(x)

x	$f(x)$
−2	1
0	7
2	13
4	19



b) Which function has the largest rate of change? Explain. *(1 point)* g(x) → ROC 2

f(x) → $\frac{7-1}{0--2} = \frac{6}{2} = 3$