#1 Let x = Chris and y = Kim. If Kim painted 10 more than twice the number that Chris painted, then:

$$y = 2x + 10$$

And if they painted 100 boards together, then:

$$x + y = 100$$

Now substitute the first equation into the second.

$$x + (2x + 10) = 100$$

$$3x + 10 = 100$$

(D)

#2 Let h stand for the number of hours. Machine one prints 600 papers an hour. Therefore:

$$\text{Machine 1} \longrightarrow 600h$$

Machine two can print 800 each hour but doesn't begin printing until 2 hours after the first machine. Therefore:

$$\text{Machine 2} \longrightarrow 800(h-2)$$

Together they must print 15,000 copies, so:

$$600h + 800(h-2) = 15{,}000$$

$$600h + 800h - 1600 = 15{,}000$$

$$+1600 \qquad +1600$$

$$\frac{1400h}{1400} = \frac{16{,}600}{1400}$$

$$h = 11.9$$

Equation: $600h + 800(h-2) = 15{,}000$ Hours: 11.9

A2A

#3 The area must be less than 65 ft^2.

$$(\text{base})(\text{height}) < 65$$
$$(2x+3)(5) < 65$$
$$10x + 15 < 65$$
$$-15 \quad -15$$
$$\frac{10x}{10} < \frac{50}{10}$$
$$x < 5$$

(D)

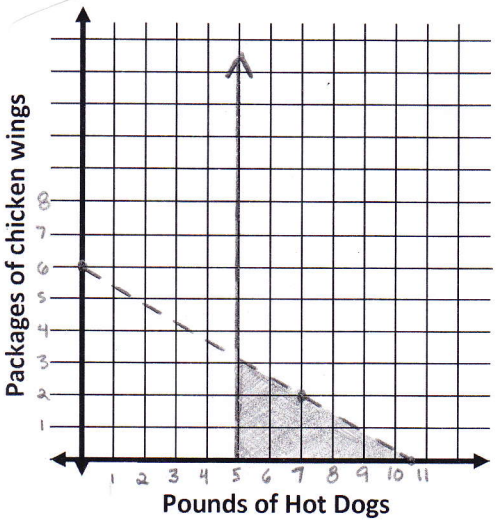
#4 Let x = pounds of hot dogs and y = packages of chicken wings. There are two clues given. One involves money and one does not, so you should makes two inequalities.

Inequality 1: $4x + 7y < 42$

Inequality 2: $x \geq 5$

Inequality 1 will be easier to graph in slope-intercept form:

$$4x + 7y < 42$$
$$-4x \qquad -4x$$
$$\frac{7y}{7} < \frac{-4x + 42}{7}$$
$$y < -\tfrac{4}{7}x + 6$$



Any point in the shaded region is a solution, so just pick two.

For example: (7,1) and (6,2)

#5 A2A

You can model the situation with an exponential function.

$$B = 5(3)^t$$

- t: increments of 12 hours
- 5: initial amount
- 3: growth factor

Since 48 hours is 4 sets of 12 hours, use $t = 4$.

$$B = 5(3)^4$$

$$B = 405$$

To find out how long it takes to have 800 bacteria, let $B = 800$ and solve for t.

$$\frac{800}{5} = \frac{5(3)^t}{5}$$

$$160 = 3^t$$

Now use "guess and check" to find t.
Since $3^4 = 81$ and $3^5 = 243$, t is between 4 and 5.
Keep testing values between 4 and 5 and you will see that:

$$t \approx 4.62$$

Since t represents sets of 12 hours, you must multiply by 12.

$$12(4.62) = 55.4 \text{ hours}$$

#6

Since W has the greatest power of 10 in its distance, it is the farthest. Z has the smallest power of 10 so it is the closest. Of the remaining two, Y must be the farthest since 2.279 is greater than 1.496.

(B) W, Y, X, Z

#7

For $a^2 - a$ to be negative, a^2 would have to be smaller than a, which is only true (for positive numbers) when a is a fraction.

$0 < a < 1$

#8

Step 1: Take care of the exponent on the second set of parentheses.

$(3x^2y^{-5})(-2xy^3)^2$

You must square everything in the parentheses.

$(3x^2y^{-5})(4x^2y^6)$

Step 2: Multiply the two terms together.

$(3x^2y^{-5})(4x^2y^6)$

$12x^4y$

#9

Step 1: Combine the coefficients and the contents of the $\sqrt{\ }$'s by multiplying.

$$3\sqrt{24} \cdot 4\sqrt{8} = 12\sqrt{192}$$

Step 2: Simplify the $\sqrt{\ }$.

$12\sqrt{192}$

$3 \quad 64$

$8 \quad 8$

$12 \cdot 8\sqrt{3}$

$96\sqrt{3}$

#10

Simply substitute the values into the expression and follow the proper order of operations.

$$\left[\frac{(-2)(\frac{1}{2}) - (-2)(5)^2}{5 - {}^{-}2}\right]^2$$

$$\left[\frac{-1 - (-2)(25)}{7}\right]^2$$

$$\left[\frac{-1 - (-50)}{7}\right]^2$$

$$\left[\frac{49}{7}\right]^2$$

$$[7]^2$$

49

#11 Finding the domain means figuring out what values of x can be used in the function. In this case, note that you may only square root a number greater than or equal to zero. Therefore:

$$3x - 6 \geq 0$$
$$+6 \qquad +6$$
$$\frac{3x}{3} \geq \frac{6}{3}$$
$$x \geq 2$$

(C)

#12

A (True) – Yes, the graph continues indefinitely from left to right.

B (NOT TRUE) – The graph's highest point has a y-value of 5, so it does not continue up towards ∞.

C (True) – You can see on the graph that f(x) crosses the x-axis at -8 and 2.

D (True) – Yes, f(x) crosses the y-axis at 2.

#13 If the diameter triples every day, the function is of the form:

$$f(x) = I(3)^t$$

I: initial amount; t: # of days

The only graph that represents an increasing exponential function is:

(A)

#14 To find $f(2)$ you must substitute 2 for x in the function.

$$f(2) = \frac{3(2)}{(2)^2 - 1}$$

$$= \frac{6}{4-1}$$

$$= \frac{6}{3}$$

$$= \boxed{2}$$

#15 If $g(x) = 4$, then:

$$4 = \frac{9}{10-x}$$

Solve for x:

$$\frac{4}{1} = \frac{9}{10-x}$$

$$40 - 4x = 9$$

$$-40 \qquad -40$$

$$\frac{-4x}{-4} = \frac{-31}{-4}$$

$$\boxed{x = 31/4}$$

#16 In an exponential function, each term is multiplied by a particular number to get the next term. Look at the table to find that multiplier.

x	y
0	3
1	6
2	r

$\times 2$

$\times 2$

Since 3 is doubled to become 6, the multiplier is 2. Now just double 6:

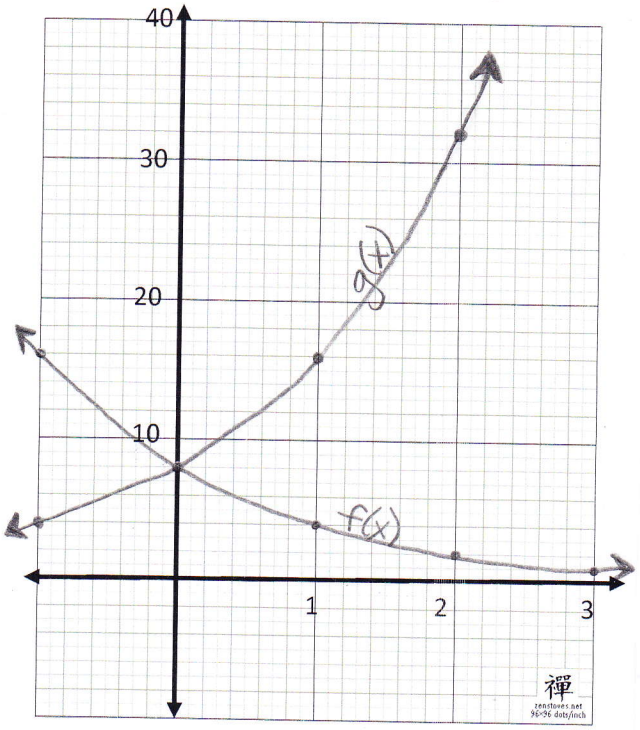
$$r = 6 \cdot 2 = 12$$

(C)

#17

A2A

X	f(x) $8(\frac{1}{2})^x$	g(x) $8(2)^x$
-2	32	2
-1	16	4
0	8	8
1	4	16
2	2	32
3	1	64



#18

Use the following compound interest formula:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

- A = balance after t years
- P = original amount
- r = annual interest rate (as decimal)
- n = # times compounded annually
- t = time in years

$$A = 2000\left(1 + \frac{.04}{2}\right)^{(2)(5)}$$

$$A = 2000(1 + .02)^{10}$$

$$A = 2000(1.02)^{10}$$

$$A = 2437.99$$

(C)

#19

4, 7, 10, 13...

+3 +3 +3

To get each term, you add 3 to the term before it.

$a(0) = 4$ $\quad a(n+1) = a(n) + 3$

#20 Isolate h:

A2A

$$2 \cdot A = \frac{h}{2}(b_1 + b_2) \cdot 2$$

$$\frac{2A}{b_1 + b_2} = \frac{h(b_1 + b_2)}{b_1 + b_2}$$

$$\boxed{h = \frac{2A}{b_1 + b_2}}$$