The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

# ALGEBRA I (Common Core)

**Wednesday,** August 12, 2015 — 8:30 to 11:30 a.m.

## MODEL RESPONSE SET

### Table of Contents

## Question 25

**25** Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

| **Day** (n) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Height** (cm) | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 |

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the $n$th day.

$h(n) = 1.5n + 1.5$

**Score 2:** The student has a complete and correct response.

## Question 25

**25** Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

| **Day** (n) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Height** (cm) | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 |

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the $n$th day.

$h(n) = 3.0 \cdot 1.5n$

The height of the plant grows by 1.5 cm per day, So $h(n)=3.0 \cdot 1.5n$ would be the equation to represent the height of the plant on the nth day.

**Score 1:** The student made a conceptual error when writing the equation.

**25** Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

+1 +1 +1 +1

| **Day** (n) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Height** (cm) | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 |

+.5 +1.5 +1.5 +1.5

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the $n$th day.

$a_n = a_1 + (n-1)d$

$f(n) = 3 + (n-1)1.5$

$f(1) = 3 + (1-1)1.5$ $\quad$ $f(2) = 3 + (2-1)1.5$

$f(1) = 3 + \cancel{0 \cdot 1.5}$ $\quad$ $f(2) = 3 + 1.5$

$f(2) = 4.5$

$\boxed{a_n = 3 + (n-1)1.5, \quad n \geq 1}$

**Score 1:** The student did not write the equation in terms of $h(n)$.

**25** Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

| **Day** (n) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Height** (cm) | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 |

+1.5 1.5 1.5

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the $n$th day.

$h(n) = 1.5x + 1.5$

Not work just testing

$h(n) = 1.5(6) + 1.5$

$= 9 + 1.5$

$h(n) = 10$

**Score 1:** The student did not write the equation in terms of $n$.

## Question 25

**25** Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

| **Day** (n) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Height** (cm) | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | |

+1.5

The plant continues to grow at a constant daily rate. Write an equation to represent $h(n)$, the height of the plant on the $n$th day.

6 = 10.5 +1.5
7 = 12.0 +1.5
8 = 13.5
9 = 15.0

$\boxed{H(n) = \cdot 15.0n + 9}$

**Score 0:** The student gave a completely incorrect response.

## Question 26

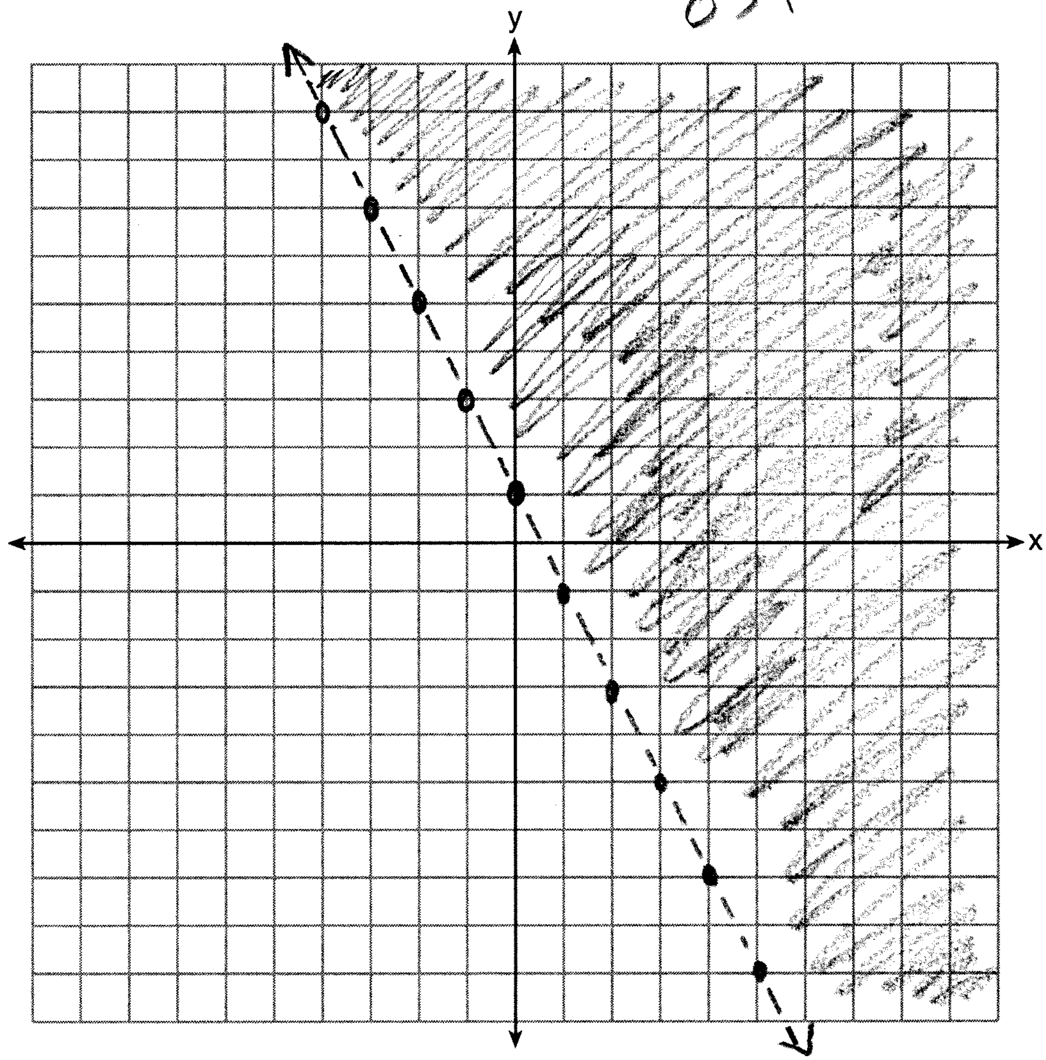
**26** On the set of axes below, graph the inequality $2x + y > 1$.

$-2x \quad -2x$

$y > 1 - 2x$

$0 > 1 - 2 \cdot 0$

$0 > 1$

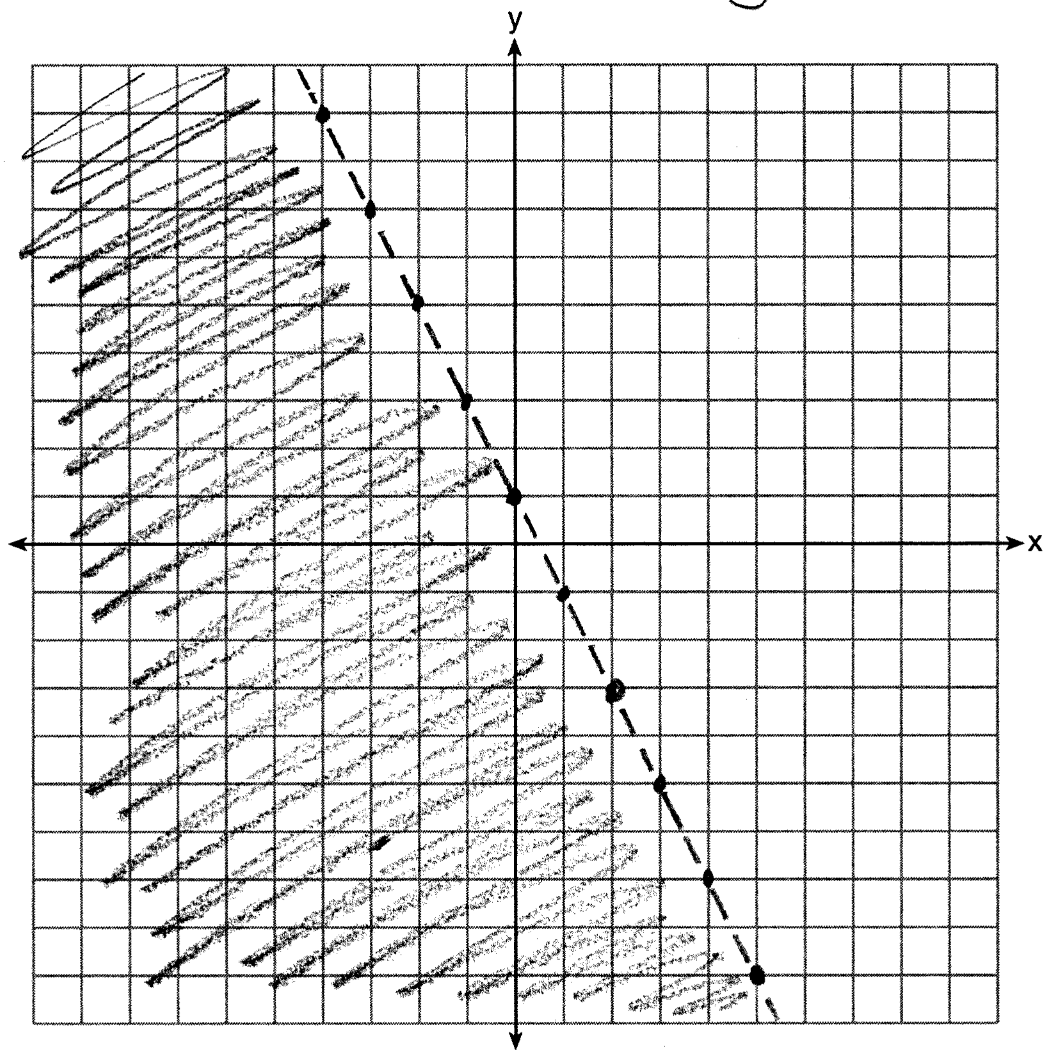



**Score 2:** The student has a complete and correct response.

## Question 26

**26** On the set of axes below, graph the inequality $2x + y > 1$.

$2x + y > 1$
$-2x \quad -2x$
$y > -2x + 1$




**Score 1:** The student shaded in the wrong direction.

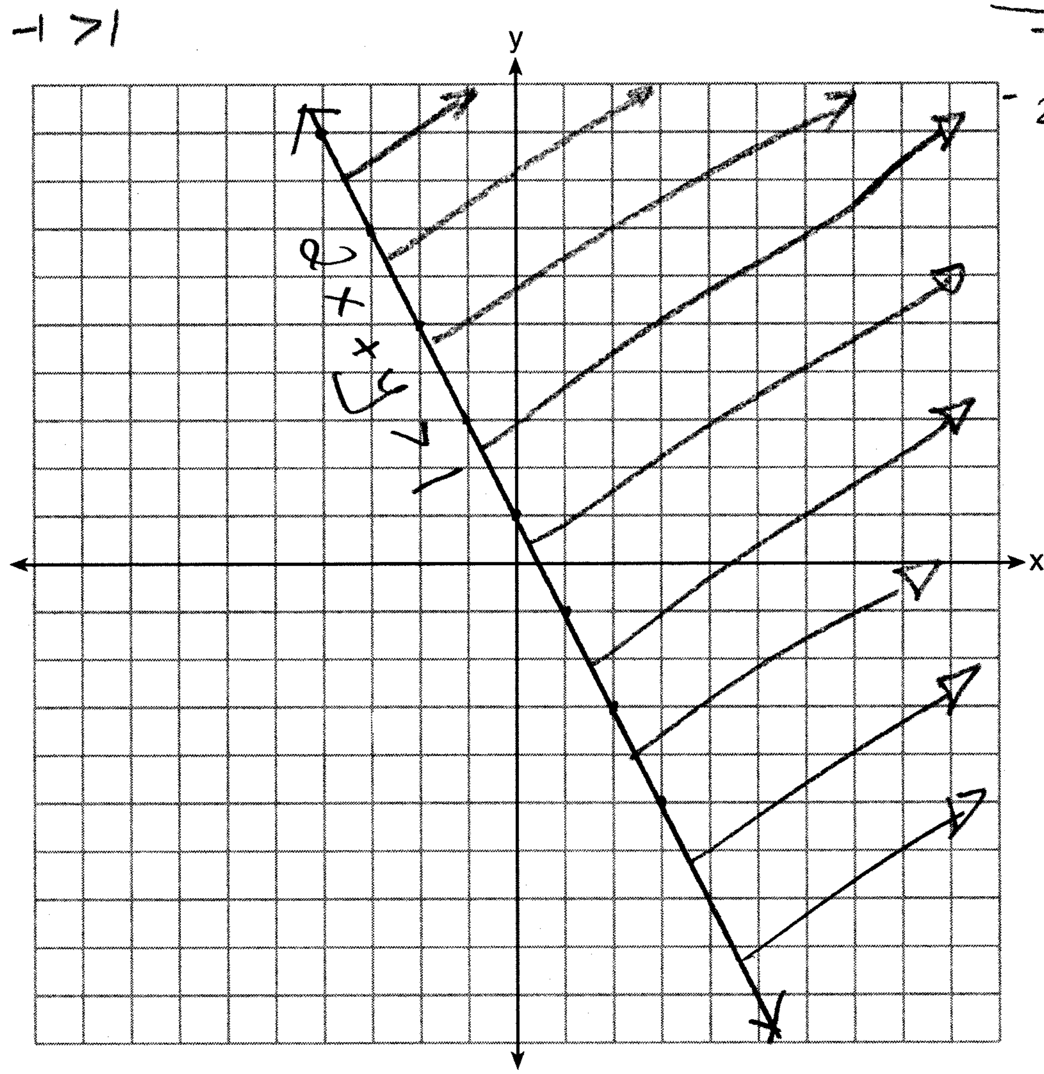
## Question 26

**26** On the set of axes below, graph the inequality $2x + y > 1$.

$2x + y > 1$
$-y \quad -y$
$-1 \quad -1$
$\frac{2x-1}{-1} > \frac{-y}{-1}$
$-2x + 1 > y$

$-2x \quad -2x$
$y > -2x + 1$

On $(-1,-1)$
$2x + y > 1$
$2(1) + -1 > 1$
$2 + -1 > 1$
$1 > 1$




**Score 1:** The student did not draw a dotted line.

## Question 26

**26** On the set of axes below, graph the inequality $2x + y > 1$.

$-2x \quad -2x$

$y > -2x + 1$

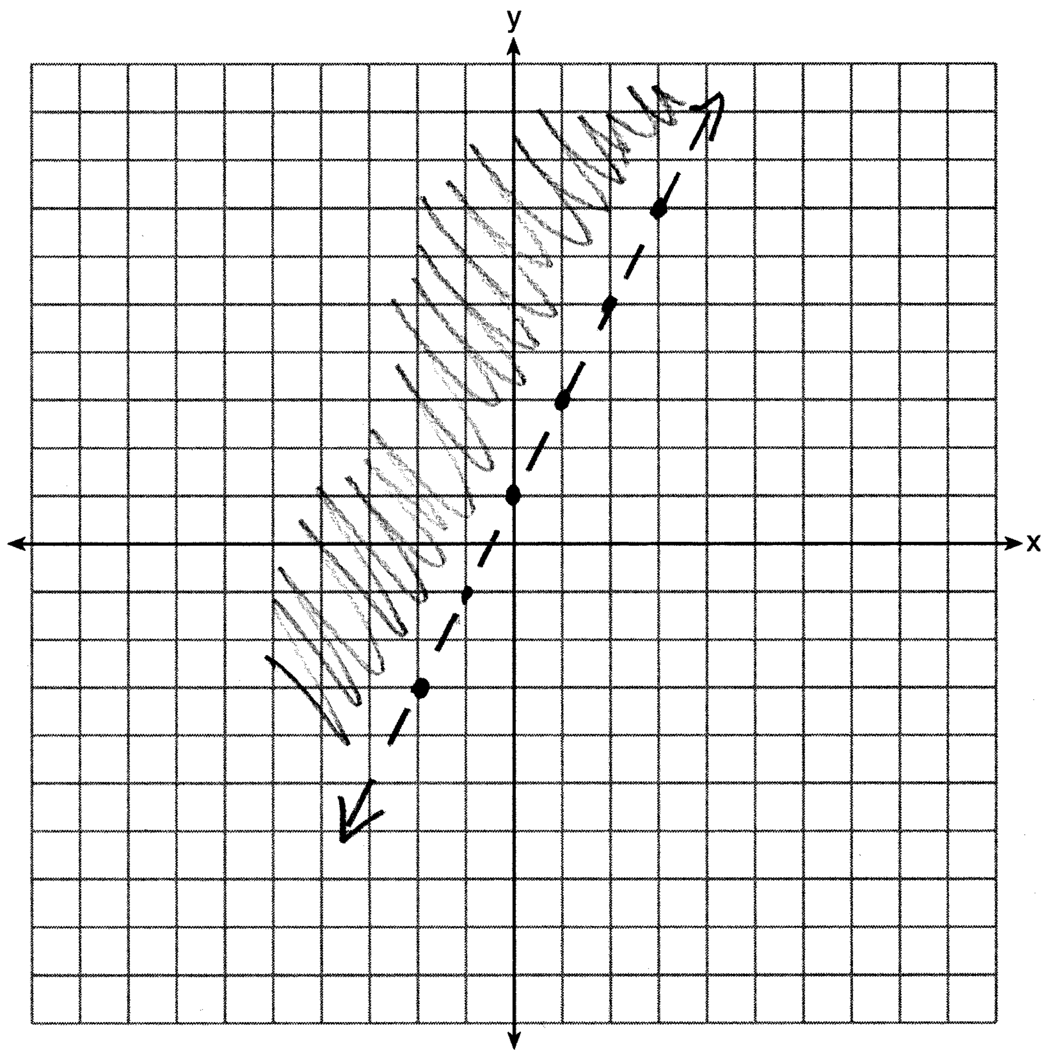
$M = 2$

$b = 1$

$2(0)+0>1$

$0+0>1$

$0>1$

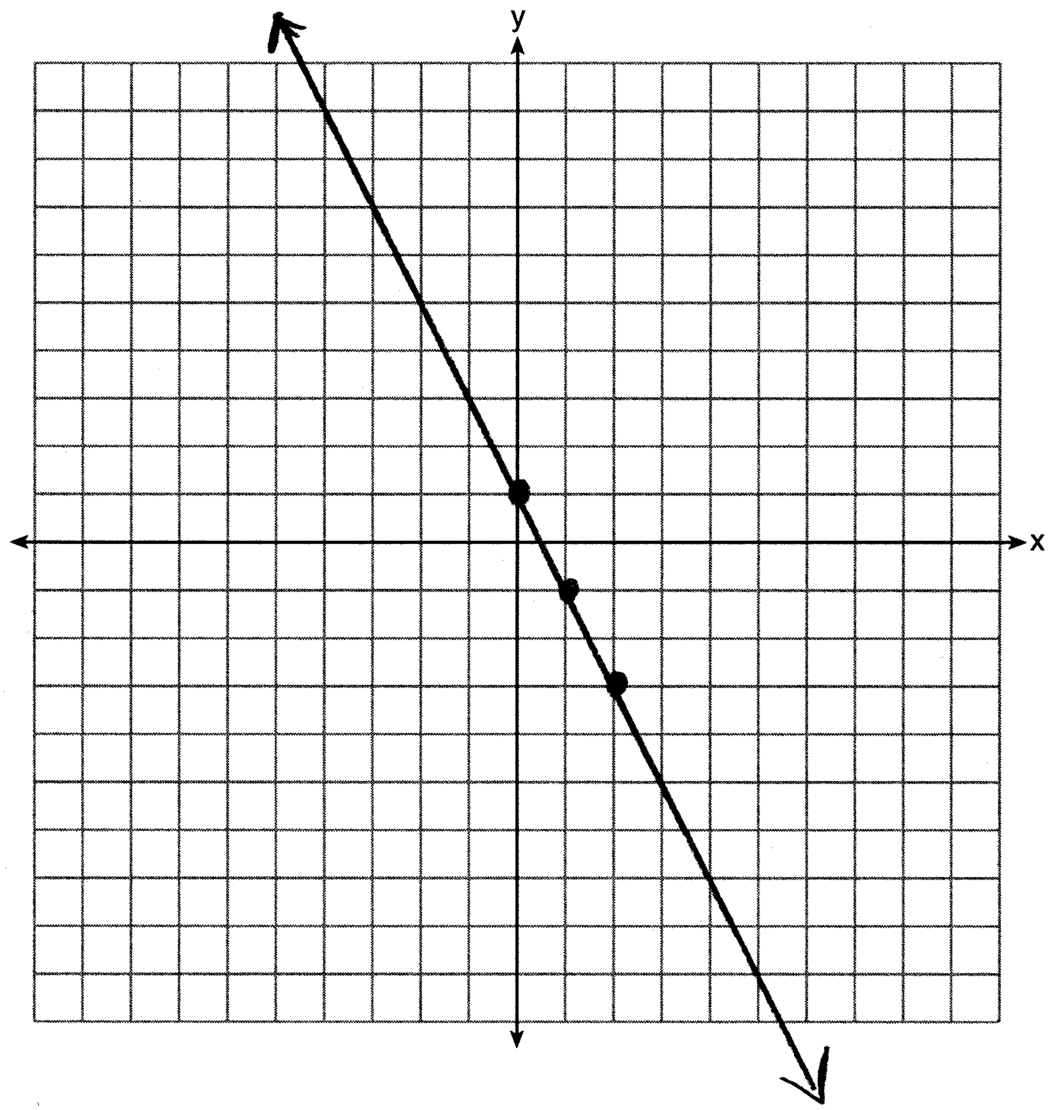



**Score 1:** The student graphed the slope incorrectly.

**Question 26**

**26** On the set of axes below, graph the inequality $2x + y > 1$.

$2x + y > 1$
$-2x \quad -2x$
$y > -2x + 1$




**Score 0:** The student did not draw a dotted line and did not shade.

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B(*x*) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

60 70 90 110 140 170 210 270 340

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model. I think exponential because the graph didn't grow at a constant rate

**Score 2:** The student has a complete and correct response.

## Question 27

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B(*x*) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

$\frac{280}{220} = 1.27$ $\frac{350}{280} = 1.25$

$\frac{440}{350} = 1.25$

Marc, because the scatterplot shows an exponential graph. The bacteria increase by about 25% each time.

**Score 2:** The student has a complete and correct response.

## Question 27

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B($x$) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

linear
$r = .964$

exponential
$r = .999$

I chose exponential because the corrolation coefficient was closer to one than the corrolation coefficient of the linear model.

**Score 1:** The student compared correlation coefficients.

## Question 27

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** *x* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B(*x*) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

The linear function is a better choice because the function is not increasing by the same amount every hour. Every hour it is increasing a little more than it did the hour before.

**Score 1:** The student made a conceptual error by confusing linear and exponential definitions.

## Question 27

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** B($x$) | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

Exponential because the numbers increase quickly.

**Score 1:** The student gave an incomplete explanation.

**27** Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their biology class.

| **Number of Hours,** $x$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of Bacteria,** $B(x)$ | 220 | 280 | 350 | 440 | 550 | 690 | 860 | 1070 | 1340 | 1680 |

Rachel wants to model this information with a linear function. Marc wants to use an exponential function. Which model is the better choice? Explain why you chose this model.

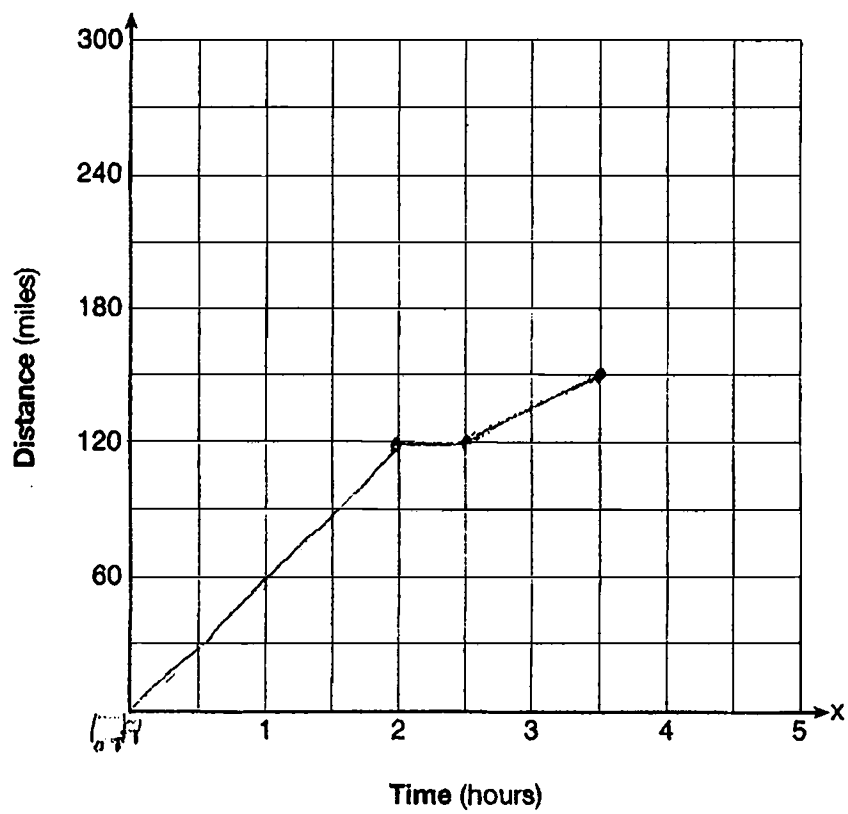
Linear because it is increasing.

**Score 0:** The student gave a completely incorrect response.

## Question 28

**28** A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

On the set of axes below, draw a graph that models the driver's distance from home.

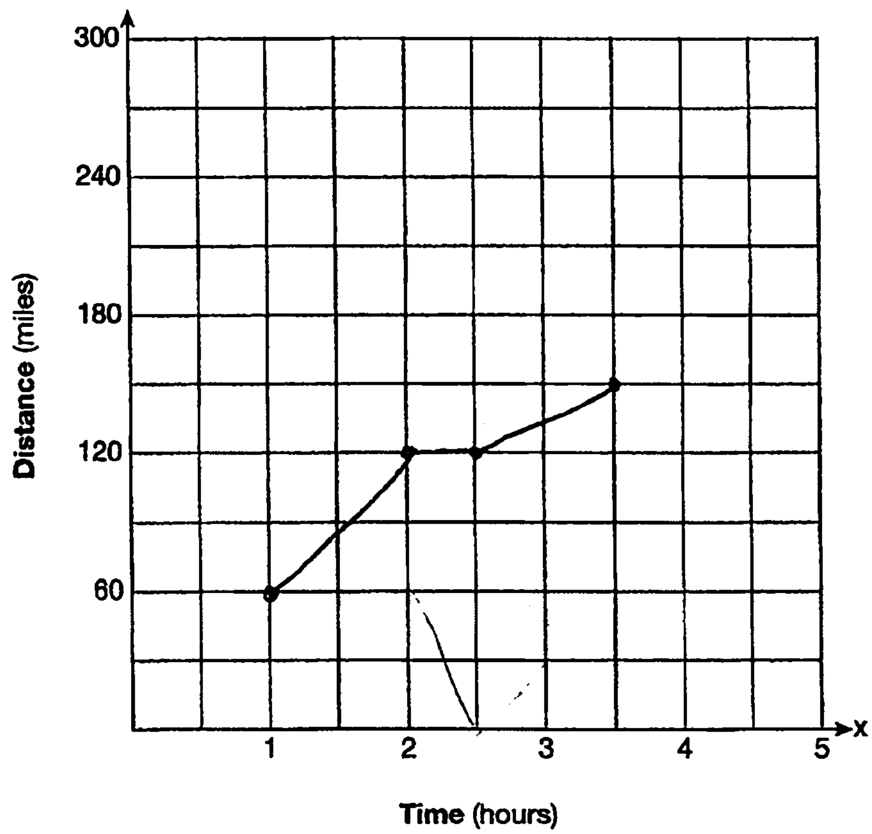



**Score 2:** The student has a complete and correct response.

## Question 28

**28** A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

On the set of axes below, draw a graph that models the driver's distance from home.



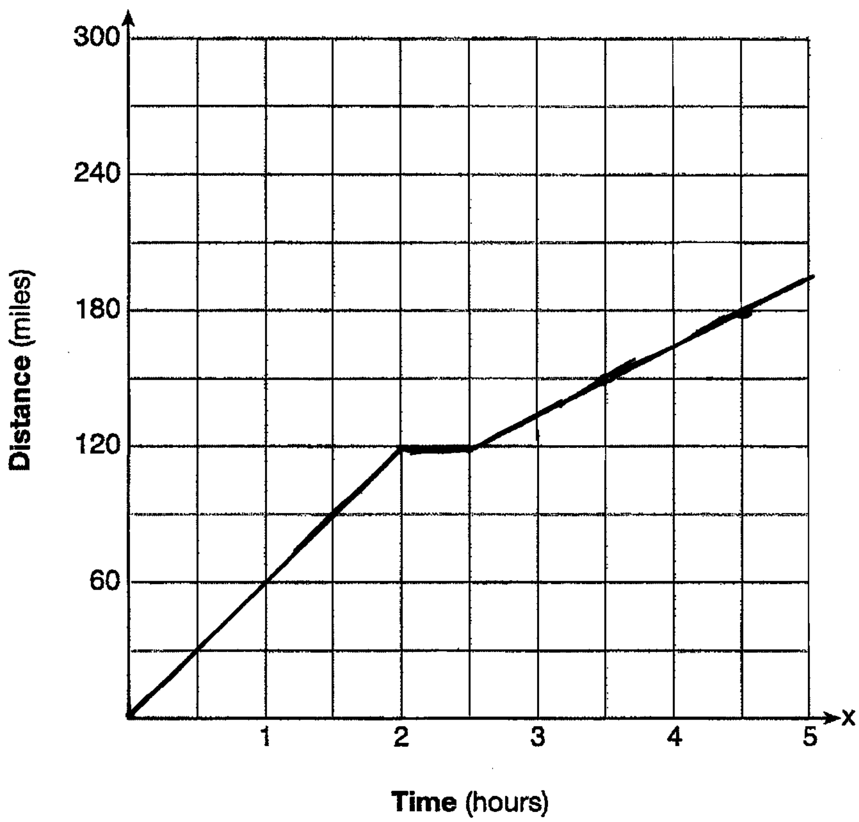

| hour | 1 | 2 | 2.5 | 3 |
|---|---|---|---|---|
| Distance | 60 | 120 | 120 | 150 |

**Score 1:** The student did not start at (0,0).

## Question 28

**28** A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

On the set of axes below, draw a graph that models the driver's distance from home.

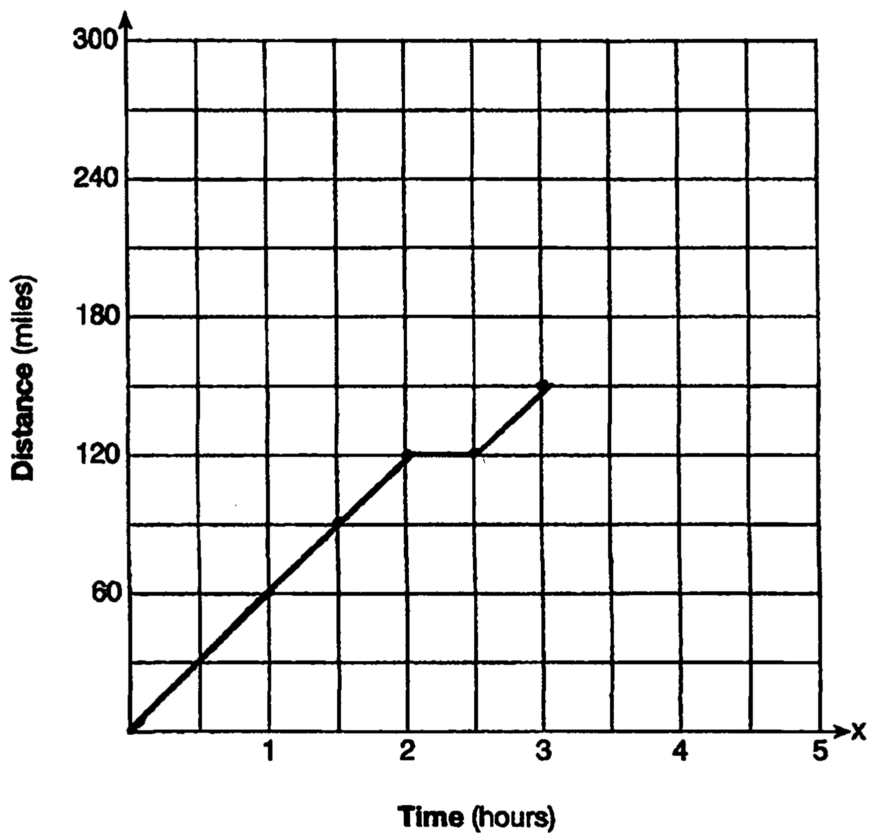



**Score 1:** The student graphed past the destination, increasing the distance from home.

## Question 28

**28** A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

On the set of axes below, draw a graph that models the driver's distance from home.




$$\begin{array}{r} 60 \\ +\ 60 \\ \hline 120 \end{array}$$

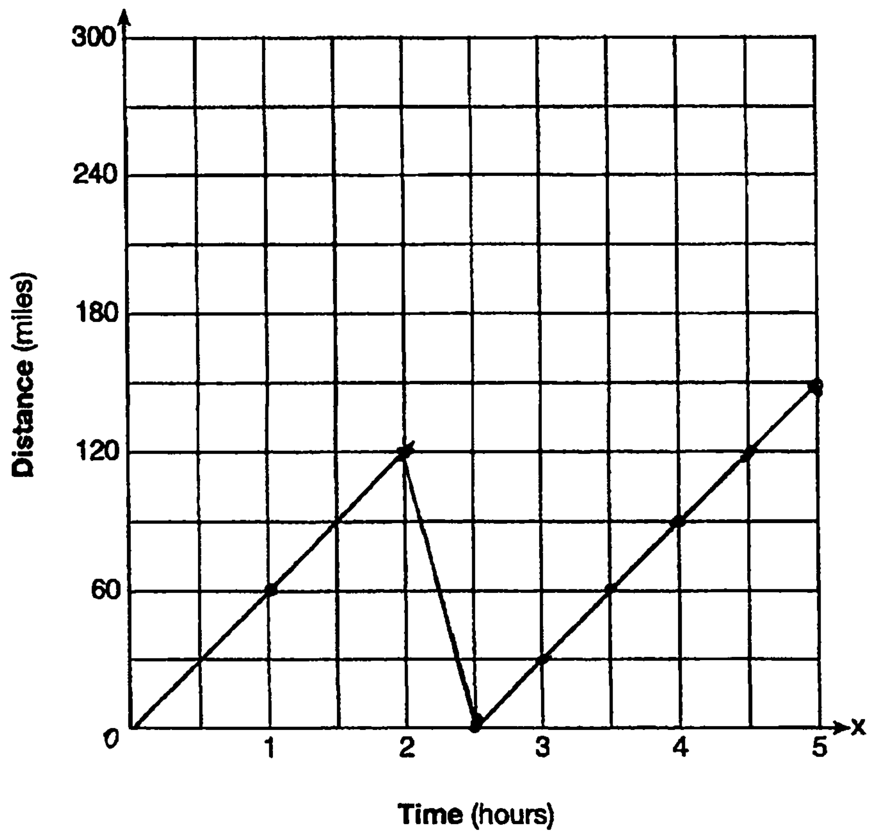
$$\begin{array}{r} 120 \\ 30 \\ \hline 150 \end{array}$$

**Score 1:** The student graphed the last hour incorrectly.

## Question 28

**28** A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her car gets a flat tire, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

On the set of axes below, draw a graph that models the driver's distance from home.




**Score 0:** The student did not correctly graph the 30 minutes that the car was stopped, and then continued at 60 mph instead of 30 mph to the end of the grid.

## Question 29

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

$a=1 \quad b=-2 \quad c=5$

$$X = \frac{2 \pm \sqrt{4-4(1)(5)}}{2(a)}$$

$$X = \frac{2 \pm \sqrt{-16}}{2}$$

No real solution

**Score 2:** The student has a complete and correct response.

## Question 29

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

None, when graphed it didn't cross the x-axis.

**Score 2:** The student has a complete and correct response.

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

$-5 \quad -5$

$x^2 - 2x = -5$

$x^2 - 2x + \boxed{1} = -5 + \boxed{1}$

$x^2 - 2x + 1 = -4$ $\quad ac = 1$, $b = -2$, $-1, -1$

$(x-1)(x-1) = -4$

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

$x - 1 = \pm 2$

$+1 \quad +1$

Solutions:

$\boxed{x = 3 \quad \{3, -1\} \quad x = -1}$

**Score 1:** The student made an error by taking the square root of −4 and found two real solutions.

## Question 29

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

NO solution because no numbers multiply to 5 and add up to −2

**Score 1:** The student gave an incomplete justification.

## Question 29

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

This equation has 2 solutions. I can tell by the $x^2$ in the beginning of the equation.

**Score 1:** The student knew that quadratic equations have two solutions, but did not answer the question regarding real solutions.

## Question 29

**29** How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

$x^2+2x+5=0$

$(x+1)(x-1)=0$

$x+1=0 \quad x-1=0$

$x=-1 \quad x=1$

2 solutions

**Score 0:** The student gave a completely incorrect response.

## Question 30

**30** The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where $x$ represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

$$\begin{array}{r} 5100 \\ -4845 \\ \hline 255 \end{array}$$ per year

$y = 5100(.95)^1$

$y = 4845$

$\frac{255}{5100} = .05$

The # of atoms decreases by 5% each year I plugged in 1 for x and got 4845, which I subtracted from 5100. It lost 255 in one year. 255 is 5 percent of 5100.

**Score 2:** The student has a complete and correct response.

## Question 30

**30** The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where $x$ represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

5%

decay= $P(1-R)^t$

(as a decimal)

**Score 1:** The student did not give an explanation.

## Question 30

**30** The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where $x$ represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

$y=5100(0.95)^x$

$y=5100(0.95)$

$y=4845$

$y=5100(0.95)^2$

$y=4602.75$

$4845-4602.75=242.25$

$\frac{4845}{100}-\frac{4602.75}{100}=\frac{242.25}{100}=\frac{2.4}{1}$

$\boxed{2.4\%}$

I found out the number of carbon atoms in a fossil for year one and two. I then subtracted them to find the difference and put it in a percent form.

**Score 1:** The student calculated the percent change incorrectly, but gave an appropriate explanation.

## Question 30

**30** The number of carbon atoms in a fossil is given by the function $y = 5100(0.95)^x$, where $x$ represents the number of years since being discovered.

What is the percent of change each year? Explain how you arrived at your answer.

$(1)=5100(.95)^1$
$(1)=4845$ } 1 year

$(2)=5100(.95)^2$
$(2)=4602.75$ } 2 years

$(3)=5100(.95)^3$
$(3)=4372.6125$ } 3 years

} 3 years

$\frac{\Delta y}{\Delta x}$ $\frac{3}{4845-4372.6125}$

.6%

I got that by finding the Δ in y and dividing it by the Δ in x, then moving the decimal place for a precentage

**Score 0:** The student gave a completely incorrect response.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

$h(t) = -16t^2 + 64t$

| x | y |
|---|---|
| 0 | 0 |
| 1 | 48 |
| 2 | 64 |
| 3 | 48 |
| 4 | 0 |

A domain is $0 \le t \le 4$ because the rocket takes off at 0 seconds and lands four sronds later.

**Score 2:** The student has a complete and correct response.

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

The domain for this function is [0, 4], as the maximum amount of time the rocket flew was, 4 seconds before it hit the ground, and in the context of the problem, you can have no negative x-values, as you cannot have negative time.

**Score 2:** The student has a complete and correct response.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

Between 0 and 4 because it starts at 0 seconds on the ground and hits the ground again at 4 seconds.

**Score 2:** The student has a complete and correct response.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

$h(t)=-16t^2+64t$  $\frac{-b}{2a}$  $\frac{-64}{-32}=2$

$y=-16(2)^2+64(2)$

64

$\boxed{[0,64]}$ because 0 is ground level and 64 is it's maximum hight

**Score 1:** The student gave the range and not the domain.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

domain $\geq 0$

seconds can't be negative

**Score 1:** The student did not realize that the height cannot be negative either.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

$0 = -16t^2 + 64t$

$16t(-t + 4) = 0$

$t = 0 \quad x = 4$

$\{0, 4\}$

The domain for this function is 0 and 4 because if you substitucle these number in equation, it will be equal to 0.

**Score 1:** The student did not state the interval.

## Question 31

**31** A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where $t$ is the time in seconds. Determine the domain for this function in the given context. Explain your reasoning.

| X | Y |
|---|---|
| -1 | -80 |
| 0 | 0 |
| 1 | 48 |
| 2 | 64 |
| 3 | 48 |
| 4 | 0 |
| 5 | -80 |

$$\frac{-64}{2(-16)} = \frac{-64}{-32} = 2$$

The domain is 2.

**Score 0:** The student gave an irrelevant response.

## Question 32

**32** Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day $d$.

$T(d) = 30 + 2d - 2$

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

$T(6) = 30 + 2(6) - 2$

$T(6) = 40$

40 min.

**Score 2:** The student has a complete and correct response.

## Question 32

**32** Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day $d$.

$$T(d) = 2d + 28$$

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

40

**Score 2:** The student has a complete and correct response.

## Question 32

**32** Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day $d$.

T = time

d = day

$30_{\text{min}} + 2_{\text{min}}(d) - 2$

$\boxed{30 + 2(d) - 2}$

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

$30 + 2(6) - 2$

$42 - 2$

$\boxed{40 \text{ minutes}}$

**Score 1:** The student wrote an expression and not an equation.

## Question 32

**32** Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day $d$.

$30+2(d)$

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

$30+2(6)$

$30+12$

42 minutes will spend on the treadmill

**Score 1:** The student gave a correct $T(6)$ based on the incorrect expression.

## Question 32

**32** Jackson is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day. Write an equation for $T(d)$, the time, in minutes, on the treadmill on day $d$.

$$T(d) = 30(.02)^d$$

Find $T(6)$, the minutes he will spend on the treadmill on day 6.

$$T(d) = 30(.02)^6$$

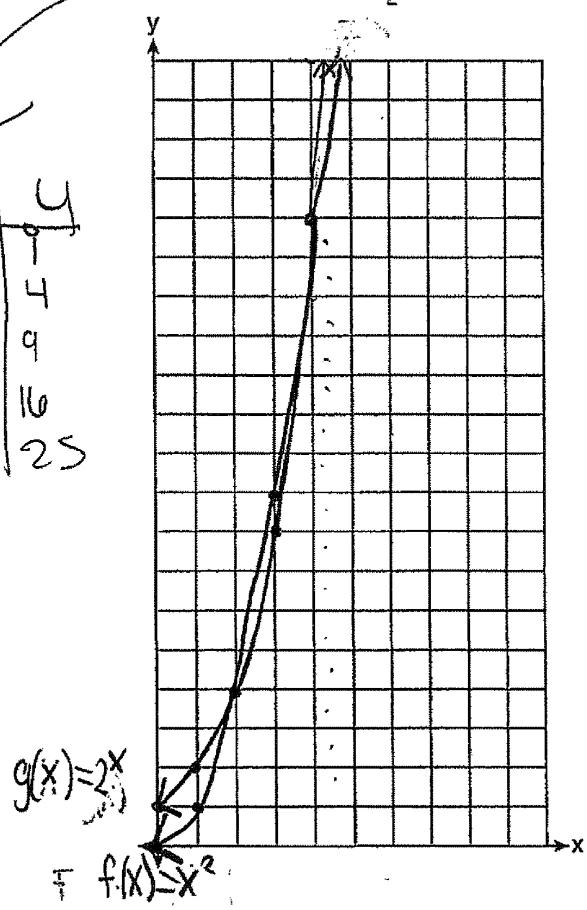
$$\approx 1.92 \text{ minutes}$$

**Score 0:** The student gave a completely incorrect response.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.

| x | y |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |
| 3 | 9 |
| 4 | 16 |
| 5 | 25 |




| x | y |
|---|---|
| 0 | 1 |
| 1 | 2 |
| 2 | 4 |
| 3 | 8 |
| 4 | 16 |
| 5 | 32 |

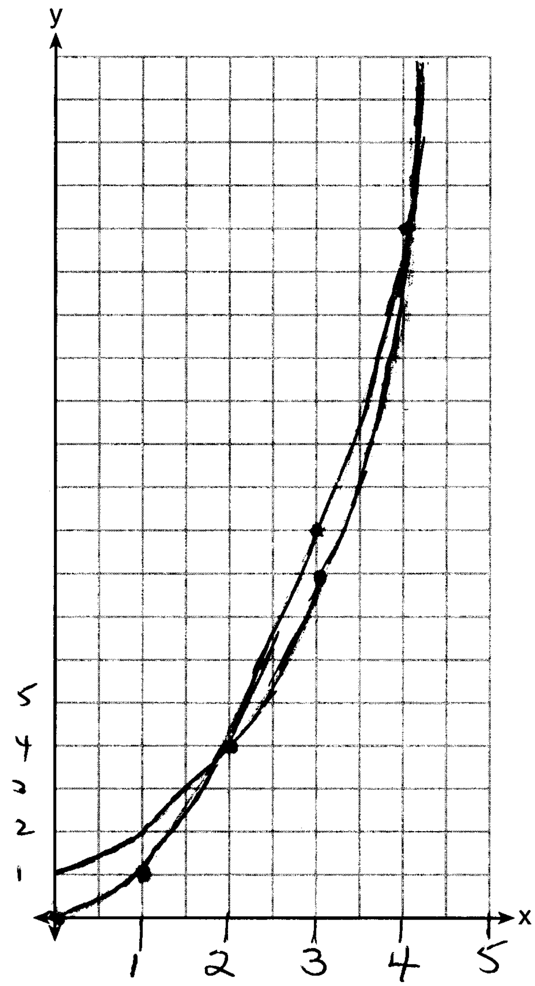
State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

g(x) has a greater value when x=20 because $2^{20}$ is larger than $20^2$.

**Score 4:** The student has a complete and correct response.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.

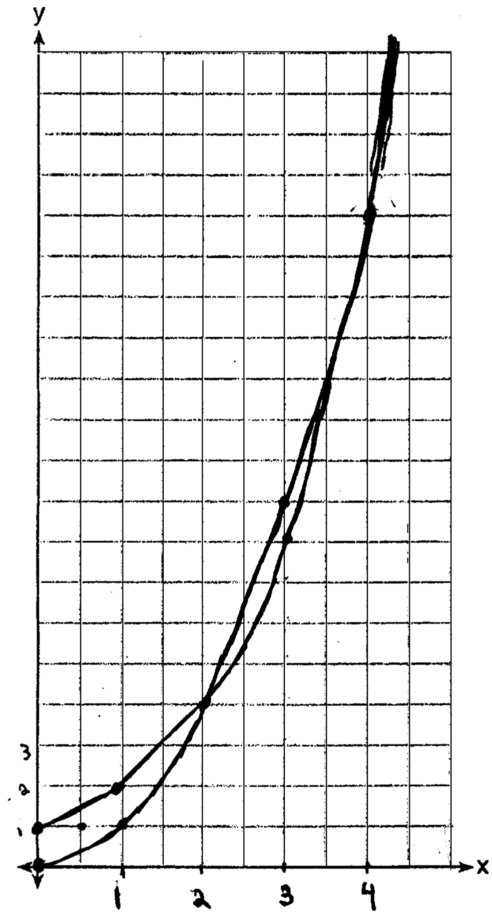



State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

$f(x) = 400$
$g(x) = 1048576$ $g(x)$

**Score 4:** The student has a complete and correct response.

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



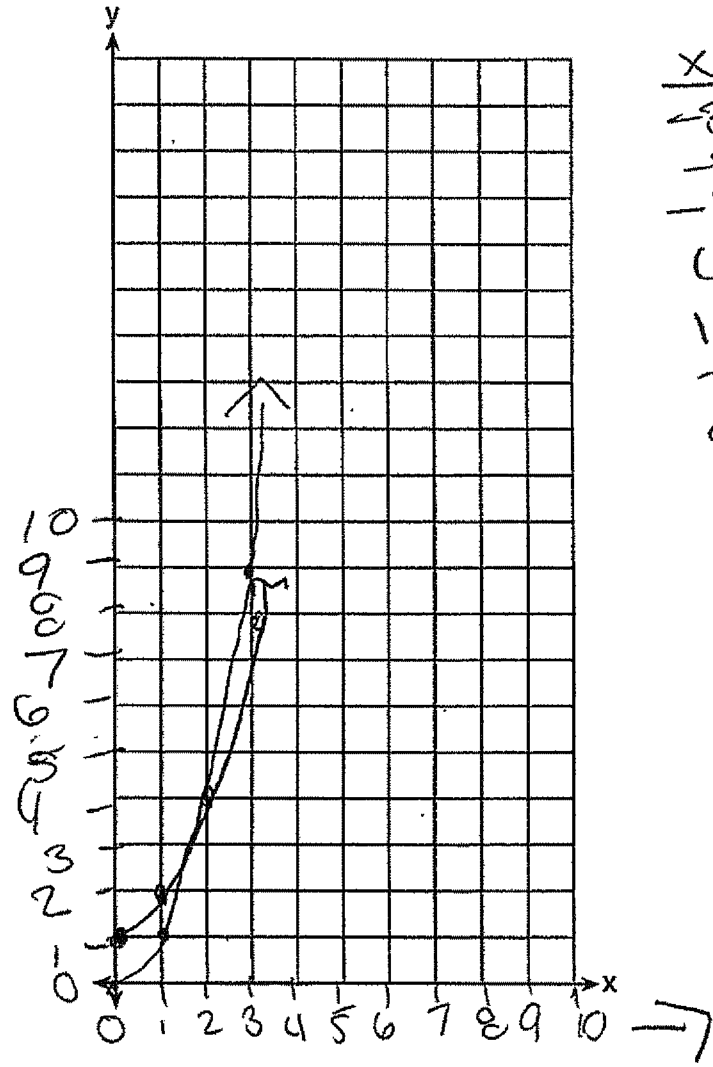

State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

$2^x$

**Score 3:** The student did not justify $2^x$.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



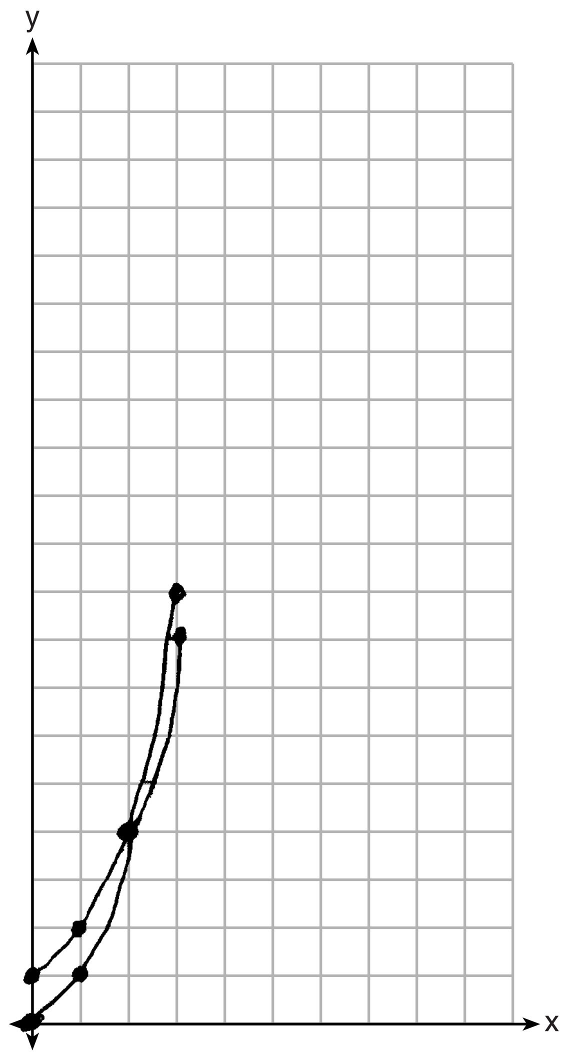
| x | y1 | y2 |
|---|---|---|
| -3 | 9 | .125 |
| -2 | 4 | .25 |
| -1 | 1 | .5 |
| 0 | 0 | 1 |
| 1 | 1 | 2 |
| 2 | 4 | 4 |
| 3 | 9 | 8 |

State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

**Score 2:** The student has a correct graph, but shows no further work.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



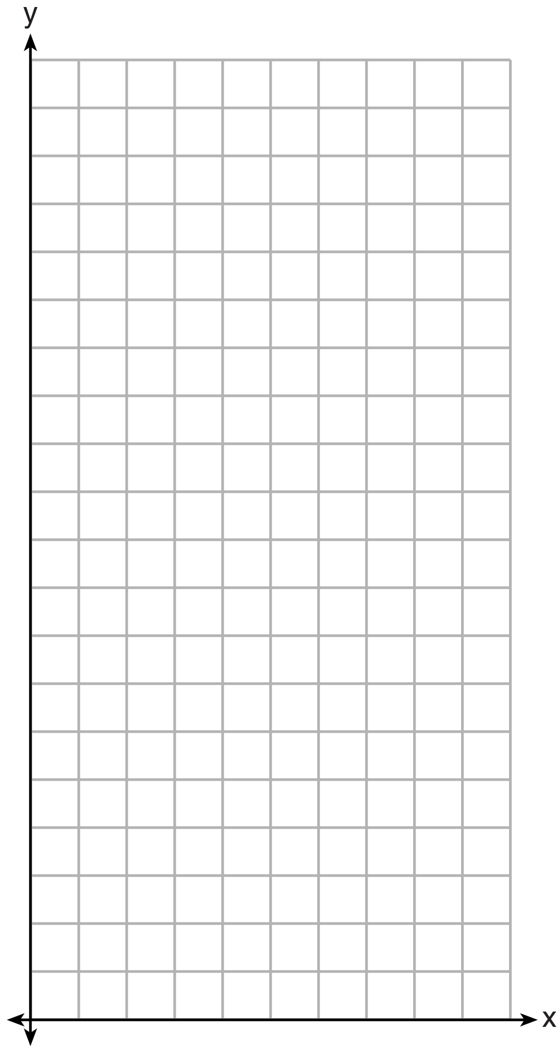

State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

g(x)

**Score 2:** The student has one graphing error by not using arrows and did not justify $g(x)$.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.




State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

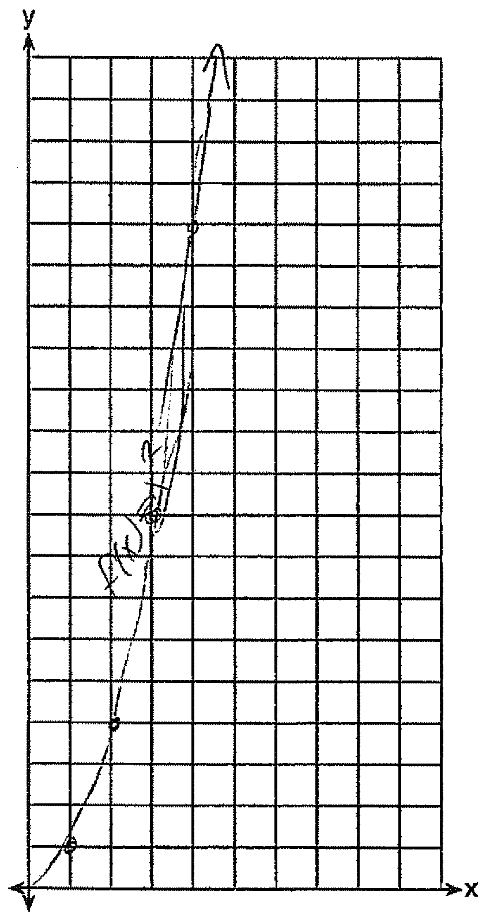
$f(x) = 20^2 = 400$

$g(x) = 2^{20} = 1048576$

**Score 2:** The student has a correct function and justification, but no graph.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



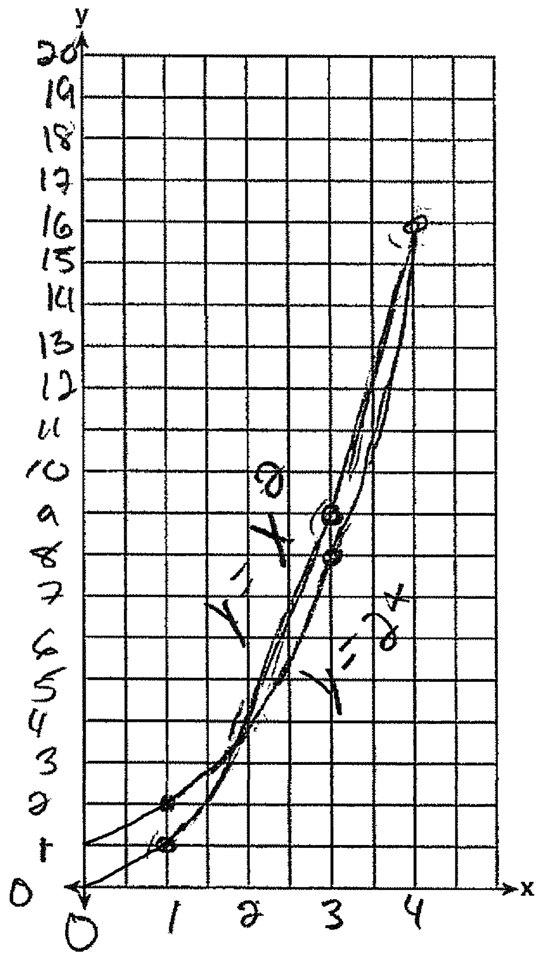
State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

I am not sure how to do this.

**Score 1:** The student graphed $f(x)$ correctly.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.



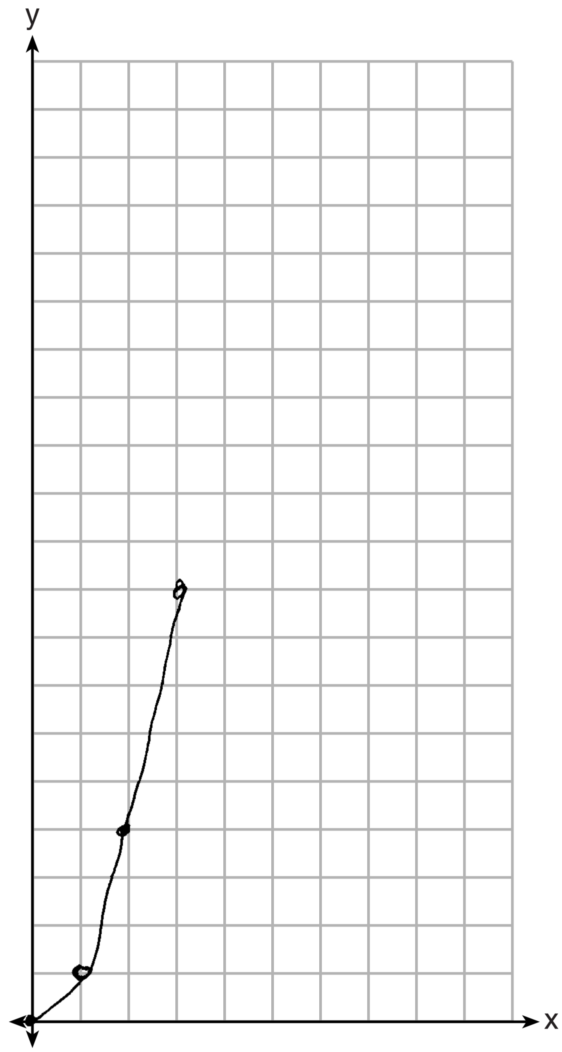

State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

$y = x^2$ has a greater value when $x = 20$

**Score 1:** The student did not put arrows on the graphs drawn and there is no further correct work.

## Question 33

**33** Graph $f(x) = x^2$ and $g(x) = 2^x$ for $x \geq 0$ on the set of axes below.




State which function, $f(x)$ or $g(x)$, has a greater value when $x = 20$. Justify your reasoning.

f(x)

**Score 0:** The student did not graph one function completely correct and no further correct work is shown.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \le 6x + 12 - 9x$

$7x - 12x + 24 \le 6x + \cancel{12} - 9x$
$-12 \quad -\cancel{12}$

$7x - 12x + 12 \le 6x - 9x$
$+12x \quad +12x$

$7x + 12 \le 6x + 3x$

$7x + 12 \le 9x$
$-7x \quad -7x$

$\frac{12}{2} \le \frac{2x}{2}$

$\boxed{x \ge 6}$ $\quad 6 \le x$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

{6,7,8}, I know this because when solving the inequality I got "$x \ge 6$" which means equal to or greater than 6. So "6,7,8"

**Score 4:** The student has a complete and correct response.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$$7x-3(4x-8)\leq 6x+12-9x$$

$$7x-12x+24\leq 6x+12-9x$$

$$-5x+24\leq -3x+12$$

$$+3x \qquad +3x$$

$$-2x+24\leq 12$$

$$-24 \qquad -24$$

$$\frac{-2x}{-2}\leq\frac{-12}{-2}$$

$$\boxed{x\geq 6}$$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

6, 7 and 8 will satisfy the integers because X is greater than or equal to 6 and 8 is the only number out of 4 and 8 that is bigger than 6.

**Score 3:** The student wrote an incorrect explanation.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$$7x - 12x + 24 \leq 6x + 12 - 9x$$

$$-5x + 24 \leq -3x + 12$$

$$-2x \leq -12$$

$$x \leq 6$$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

4, 5, 6

because they are the numbers less than or equal to six in the interval

**Score 3:** The student did not reverse the inequality symbol when dividing by a negative, but gave appropriate numbers and explanation.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$7x - 12x + 24 \leq 6x + 12 - 9x$

$-5x + 24 \leq -3x + 12$

$12 \leq 2x$

$6 \leq x$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

$\{4, 5, 6\}$

The bracket [ ] means that it includes all numbers between the two numbers in the brackets as well as the two numbers shown. The bracket meant $4 \leq x \leq 8$, and 4, 5, 6 are equal to or less than 6.

**Score 3:** The student did not state the correct integers, but gave an appropriate explanation.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$7x - 3(4x - 8) \leq 6x + 12 - 9x$

$7x - 12x + 24 \leq 6x - 3x + 12$

$-5x + 24 \leq -3x + 12$

$+5x \qquad +5x$

$24 \leq 2x + 12$

$-12 \qquad -12$

$\frac{12}{2} \leq \frac{2x}{2}$

$\boxed{6 \leq x}$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

4 5 6 7 8

I got these numbers because if x is in the interval between 4 and 8 then it's one of the answers above

**Score 2:** The student solved the inequality correctly, but showed no further correct work.

## Question 34

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$$7x - 12x + 24 \leq 6x + 12 - 9x$$
$$-5x + 24 \leq 6x - 9x + 12$$
$$-5x + 24 \leq -3x + 12$$
$$+3x \qquad\qquad +3x$$
$$-2x + 24 \leq 12$$
$$-24 \qquad -24$$
$$\frac{-2x}{-2} \leq \frac{-12}{-2}$$
$$x \leq 6$$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

**Score 1:** The student did not reverse the inequality symbol when dividing by a negative and showed no further correct work.

**34** Solve for $x$ algebraically: $7x - 3(4x - 8) \leq 6x + 12 - 9x$

$7x - 12x - 24 \leq 6x + 12 - 9x$

$-5x - 24 \leq -3x + 12$
$+3x \;\; +24 \quad +3x \;\; +24$

$\frac{-2x}{-2} \leq \frac{36}{-2}$

$x \leq -18$

If $x$ is a number in the interval [4,8], state all integers that satisfy the given inequality. Explain how you determined these values.

4, 5, 6, 7, 8 are all in my interval because everything above -18 is included

**Score 0:** The student gave a completely incorrect response.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$\frac{V}{\pi h}$

$\frac{V = \pi r^2 h}{\pi}$ $\cancel{\frac{V}{\pi h} \sqrt{r^2}}$

$\frac{V}{\pi} = \frac{r^2 h}{h}$ $\frac{V}{\pi} \div h = r^2 \rightarrow \boxed{\sqrt{\frac{V}{\pi} \div h} = r}$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$66 = \pi r^2 (3.3)$

$\sqrt{\frac{66}{\pi} \div 3.3} = r$

$2.5 = r$

$\boxed{5 = d}$

$2.5 \times 2 = 5.0$

**Score 4:** The student has a complete and correct response.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$$r = \sqrt{\left(\frac{V}{\pi h}\right)}$$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

3in.

$\boxed{6in}$

$r = \sqrt{\left(\frac{V}{\pi h}\right)}$

$r = \sqrt{\left(\frac{66}{3.3\pi}\right)}$

$r = \sqrt{\left(\frac{66}{10.36725576}\right)}$

$r = \sqrt{6.366197724}$

$r = 2.523132522$

$r = 3in.$

$d = 2r$

$d = 6in.$

**Score 3:** The student made a premature rounding error.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$$\frac{V}{\pi h} = \frac{\pi r^2 h}{\pi h}$$

$$\sqrt{\frac{V}{\pi h}} = \sqrt{r^2}$$

$$\boxed{\sqrt{\frac{V}{\pi h}} = r}$$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$$V = \pi r^2 h$$

$$\frac{66}{3.3\pi} = \frac{\pi r^2(3.3)}{3.3\pi}$$

$$\sqrt{20\pi} = \sqrt{r^2}$$

$$r = 7.926654595$$

$$d = 2r$$

$$\boxed{d \approx 16 \text{ meters}}$$

**Score 3:** The student multiplied by π instead of dividing by π.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$$VH = \pi r^2$$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$$66 \cdot 3.3 = \pi r^2$$

$$\frac{217.8}{\pi} = \frac{\cancel{\pi} r^2}{\cancel{\pi}}$$

$$\sqrt{69.328} = \sqrt{r^2}$$

$$8.326 = r$$

$$2r = d$$

$$2(8.326) = d$$

$$\cancel{16.652} = d$$

$$17 = d$$

The diameter would be 17 meters.

**Score 2:** The student stated an incorrect equation but solved it appropriately.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$$\frac{V}{\pi h} = \frac{\pi \boxed{r^2} h}{\pi h} \qquad \frac{V}{\pi h} = r^2$$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$$V = \pi r^2 h$$

$$\frac{66}{\pi 3.3} = \frac{\pi r^2 3.3}{\pi 3.3}$$

$$\frac{66}{10.3672\text{5576}} =$$

$$r^2 = 6.366197722 \cdot 2$$

$$d = 5.046265043$$

$$\sqrt{6.366197722}$$

**Score 2:** The student did not take the square root of $r^2$ and did not round the diameter.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$$\frac{V}{h} = \frac{\pi r^2}{\pi}\frac{h}{h}$$

$$\frac{x}{\pi} \qquad x = (r)^2$$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$$\frac{66}{3.3} = \pi (r)^2 \frac{3.3}{3.3}$$

$$\frac{20}{\pi} = \frac{\pi}{\pi}(r)^2$$

$$6.3662 = (r)^2 \qquad r = 2.523$$

**Score 1:** The student found the correct radius, but no further correct work is shown.

## Question 35

**35** The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$. Write an equation to find the radius, $r$, in terms of $V$ and $h$.

$V = \pi 2^2 h$

$V = 4\pi h$

$V = 12.56637061(h)$

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

$V = \pi r^2 h$

$66 = \pi r^2(3.3)$

$\frac{66}{3.3\pi} = \frac{3.3\pi}{3.3\pi} r^2$

$62.83185307 = r^2$

$\boxed{d = 126 \text{ m}}$

**Score 0:** The student gave a completely incorrect response.

## Question 36

**36** The table below shows the attendance at a museum in select years from 2007 to 2013.

**Attendance at Museum**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 4 | 6 |
| x | **Year** | 2007 | 2008 | 2009 | 2011 | 2013 |
| y | **Attendance** (millions) | 8.3 | 8.5 | 8.5 | 8.8 | 9.3 |

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and $y$ is used to represent the attendance. Round all values to the *nearest hundredth*.

$y = 0.16x + 8.27$

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

$r = 0.97$

The data suggest a strong association.

**Score 4:** The student has a complete and correct response.

## Question 36

**36** The table below shows the attendance at a museum in select years from 2007 to 2013.

**Attendance at Museum**

| **Year** | 2007 | 2008 | 2009 | 2011 | 2013 |
|---|---|---|---|---|---|
| **Attendance** (millions) | 8.3 | 8.5 | 8.5 | 8.8 | 9.3 |

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and $y$ is used to represent the attendance. Round all values to the *nearest hundredth*.

put values into stat, edit, then found linreg(ax+b)

$y = .1577586207x + 8.264827586$

$y = .16x + 8.27$

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

the correlation coefficient is .9745077635, which means the data has a strong assosiatin (the correlation coefficient is close to "1"). This means that it is clear that as years go by, more people attend ~~the~~ the museum.

**Score 3:** The student did not round the correlation coefficient.

**36** The table below shows the attendance at a museum in select years from 2007 to 2013.

**Attendance at Museum**

| | 0 | 1 | 2 | 4 | 6 |
|---|---|---|---|---|---|
| **Year** | 2007 | 2008 | 2009 | 2011 | 2013 |
| **Attendance** (millions) | 8.3 | 8.5 | 8.5 | 8.8 | 9.3 |

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and $y$ is used to represent the attendance. Round all values to the *nearest hundredth*.

$y = 0.16x + 8.27$

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

strong association

**Score 2:** The student stated a correct equation, but no credit is given for strong with no proof.

## Question 36

**36** The table below shows the attendance at a museum in select years from 2007 to 2013.

**Attendance at Museum**

| **Year** | 2007 | 2008 | 2009 | 2011 | 2013 |
|---|---|---|---|---|---|
| **Attendance** (millions) | 8.3 | 8.5 | 8.5 | 8.8 | 9.3 |

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and $y$ is used to represent the attendance. Round all values to the *nearest hundredth*.

$y = .158x - 308$

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

.975 = Strong

**Score 1:** The student has an incorrect equation and the correlation coefficient is rounded incorrectly.

## Question 36

**36** The table below shows the attendance at a museum in select years from 2007 to 2013.

**Attendance at Museum**

| **Year** | 2007 | 2008 | 2009 | 2011 | 2013 |
|---|---|---|---|---|---|
| **Attendance** (millions) | 8.3 | 8.5 | 8.5 | 8.8 | 9.3 |

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and $y$ is used to represent the attendance. Round all values to the *nearest hundredth*.

$y = 0.23(x) + 8.22$

State the correlation coefficient to the *nearest hundredth* and determine whether the data suggest a strong or weak association.

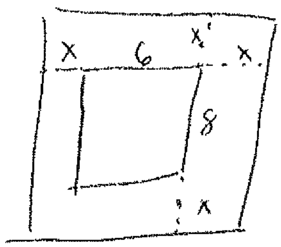
strong positive correlation

**Score 0:** The student receives no credit for stating strong with no correlation coefficient.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.




$$(2x+8)(2x+6)=100$$
$$4x^2+12x+16x+48=100$$
$$4x^2+28x+48=100$$
$$4x^2+28x-52=0$$

Explain how your equation or inequality models the situation.

The frame needs to have the same amount "x" added to both sides of the picture making it 2x on both the length and the width. Area tells us we have to multiply them together.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$$4x^2+28x-52=0$$
$$4(x^2+7x-13)=0$$

$$x=\frac{-7\pm\sqrt{7^2-4(1)(-13)}}{2}$$

$$\boxed{x=1.5}$$

$\cancel{x=-8.5}$ reject

**Score 6:** The student has a complete and correct response.

## Question 37

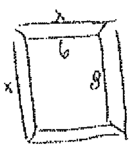
**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

Let $x$ = width of the frame

$\cancel{100 \geq}$ $100 \geq (8+2x)(6+2x)$

Explain how your equation or inequality models the situation.




The area can not be more than 100 sq. in. Since the frame has two parts added to each side, we need 2x added to the six and the eight.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$100 \geq 48 + 16x + 12x + 4x^2$

$100 \geq 4x^2 + 28x + 48$

$0 \geq 4x^2 + 28x - 52$

$\cancel{0 \geq 4(x^2 + 13x}$

$0 \geq 4(x^2 + 7x - 13)$

$x \leq \dfrac{-7 \pm \sqrt{7^2 - 4(1)(-13)}}{2}$

$x \leq 1.5$ ~~or -8.52~~

**Score 6:** The student has a complete and correct response.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$$(x+8)(x+6) = 100$$

Explain how your equation or inequality models the situation.

My x represents the ~~amoutt~~ amount a picture is increased. Area is length times width. x+8 is my new length and x+6 is my new width.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$$x^2 + 14x + 48 = 100$$
$$x^2 + 14x + 49 = 52 + 49$$
$$(x+7)^2 = 101$$
$$x+7 = \pm\sqrt{101}$$
$$x = -7 \pm \sqrt{101}$$
$$x = 3.05$$

Max frame width = 1.5

**Score 6:** The student has a complete and correct response.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

x= width

$100 \geq (2x+8)(2x+6)$

Explain how your equation or inequality models the situation.

(2x+8) is the new length of the picture + the frame

(2x+6) is the new width of the picture + the frame

width x length = area

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$100 \geq 4x^2 + 28x + 48$

$0 \geq 4x^2 + 28x - 52$

$0 \geq 4(x^2 + 7x - 13)$

$x \leq -7 \pm \sqrt{7^2 - 4(1)(-13)}$

1.5

-8.5

**Score 5:** The student did not reject the negative answer.

**Question 37**

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$$(8+2x)(6+2x)=100$$

Explain how your equation or inequality models the situation.

I multiplied length times width

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$$48+28x+4x^2=100$$
$$x^2+7x+12=25$$
$$x^2+7x-13=0$$
$$\frac{-7\pm\sqrt{49-4(-13)}}{2}=1.5$$

**Score 5:** The student has an incomplete explanation.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$(6+x)(8+x) \leq 100$

Explain how your equation or inequality models the situation.

6+x is my new width
8+x is my new length

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$48+14x+x^2=100$

$x^2+14x+48=100$

$x^2+14x+49=52+49$

$(x+7)^2=101$

$x+7=\pm\sqrt{101}$

$x=-7\pm\sqrt{101}$

$x=3.05$

Width = 3.1

**Score 4:** The student has an incomplete explanation and did not divide the width by 2.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$$(8+2x)(6+2x) = 100$$

Explain how your equation or inequality models the situation.

THE FRAME needs TO HAVE THE SAME Amount to Both sides of THE PICTURE, making it 2X on both the length and the width. Area tells us to multiply them together

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$$48+4x^2 = 100$$
$$4x^2+100-48=0$$
$$4x^2+52=0$$

$$4(x^2+13)=\frac{0}{4}$$
$$x^2+13=0$$
$$x=\pm\sqrt{13}$$
$$x=3.6 \text{ inch}$$

**Score 3:** The student wrote a correct equation and explanation, but no further correct work is shown.

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

Let x = addition to width

$(6+2x)(8+2x) \leq 100$

Explain how your equation or inequality models the situation.

The max is 100 sq in and he wants the same width on all sides so it must 2x so that it is added to all 4 sides of picture

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

$(6+2x)(8+2x) \leq 100$

$x = 1.5$ max width is 1.5 in

**Score 3:** The student wrote a correct inequality but gave an incorrect explanation, and stated 1.5, but showed no work.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$$(2x+8)(2x+6)=100$$

Explain how your equation or inequality models the situation.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

**Score 2:** The student wrote a correct equation.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

Explain how your equation or inequality models the situation.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

1.5

**Score 1:** The student has a correct answer but no work is shown.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

$(8+2x)(6+2x)$

Explain how your equation or inequality models the situation.

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

**Score 1:** The student wrote a correct expression.

## Question 37

**37** A rectangular picture measures 6 inches by 8 inches. Simon wants to build a wooden frame for the picture so that the framed picture takes up a maximum area of 100 square inches on his wall. The pieces of wood that he uses to build the frame all have the same width.

Write an equation or inequality that could be used to determine the maximum width of the pieces of wood for the frame Simon could create.

Explain how your equation or inequality models the situation.

area = length x width

Solve the equation or inequality to determine the maximum width of the pieces of wood used for the frame to the *nearest tenth of an inch*.

**Score 0:** The student wrote an incomplete explanation and no further work.