

T3-1 Study Guide and Intervention *(continued)*

Rate of Change and Slope

Find Slope The **slope** of a line is the ratio of change in the y -coordinates (rise) to the change in the x -coordinates (run) as you move in the positive direction.

Slope of a Line	$m = \frac{\text{rise}}{\text{run}}$ or $m = \frac{y_2 - y_1}{x_2 - x_1}$, where (x_1, y_1) and (x_2, y_2) are the coordinates of any two points on a nonvertical line
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Example 1 Find the slope of the line that passes through $(-3, 5)$ and $(4, -2)$.

Let $(-3, 5) = (x_1, y_1)$ and $(4, -2) = (x_2, y_2)$.

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\
 &= \frac{-2 - 5}{4 - (-3)} && y_2 = -2, y_1 = 5, x_2 = 4, x_1 = -3 \\
 &= \frac{-7}{7} && \text{Simplify.} \\
 &= -1
 \end{aligned}$$

Example 2 Find the value of r so that the line through $(10, r)$ and $(3, 4)$ has a slope of $-\frac{2}{7}$.

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\
 -\frac{2}{7} &= \frac{4 - r}{3 - 10} && m = -\frac{2}{7}, y = 4, y_1 = r, x_2 = 3, x_1 = 10 \\
 -\frac{2}{7} &= \frac{4 - r}{7} && \text{Simplify.} \\
 -2(-7) &= 7(4 - r) && \text{Cross multiply.} \\
 14 &= 28 - 7r && \text{Distributive Property} \\
 -14 &= -7r && \text{Subtract 28 from each side.} \\
 2 &= r && \text{Divide each side by } -7.
 \end{aligned}$$

Exercises

Find the slope of the line that passes through each pair of points.

- | | | |
|----------------------|-------------------------|--------------------------|
| 1. $(4, 9), (1, 6)$ | 2. $(-4, -1), (-2, -5)$ | 3. $(-4, -1), (-4, -5)$ |
| 4. $(2, 1), (8, 9)$ | 5. $(14, -8), (7, -6)$ | 6. $(4, -3), (8, -3)$ |
| 7. $(1, -2), (6, 2)$ | 8. $(2, 5), (6, 2)$ | 9. $(4, 3.5), (-4, 3.5)$ |

Find the value of r so the line that passes through each pair of points has the given slope.

- | | | |
|------------------------------|---|-------------------------------|
| 10. $(6, 8), (r, -2), m = 1$ | 11. $(-1, -3), (7, r), m = \frac{3}{4}$ | 12. $(2, 8), (r, -4), m = -3$ |
| 13. $(7, -5), (6, r), m = 0$ | 14. $(r, 4), (7, 1), m = \frac{3}{4}$ | 15. $(7, 5), (r, 9), m = 6$ |

ALGEBRA
Slope and Rate of Change

Name: _____

Period: _____

The rate of change is constant in the table. Find the rate of change. Explain what the rate of change means for the situation.

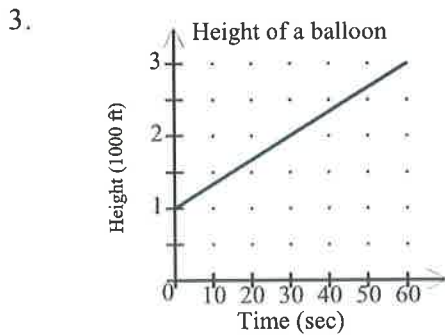
1.

Time (days)	Cost (dollars)
3	75
4	100
5	125
6	150

2.

Time (hours)	Distance (miles)
4	232
6	348
8	464
10	580

Find the rates of change for each graph below. Explain what the rate of change means for the situation.



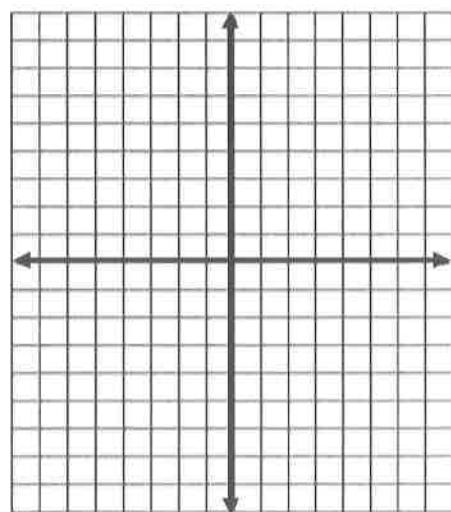
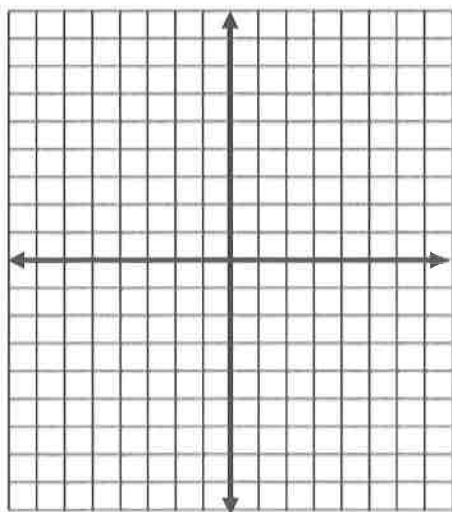
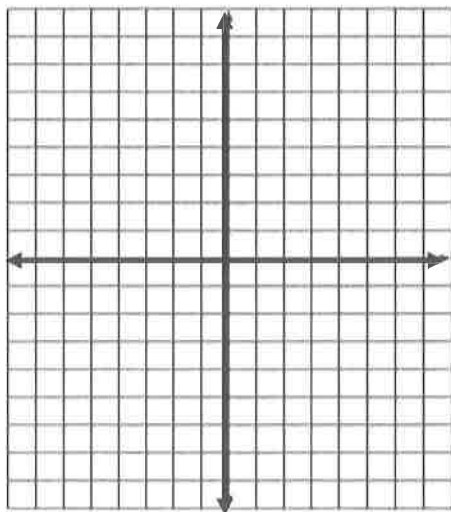
T3-2 Graphing with Tables RETAKE PROBLEMS

First, plug in the x-values to complete the coordinate point.

Second plot points on the graphs below. There will be two lines graphed on each grid.

Third connect the points and describe the type of slope.

<p style="text-align: center;">1. $y = -2x$</p> <table border="1" style="width: 100%; border-collapse: collapse; height: 100px;"> <thead> <tr> <th style="width: 10%;">X</th> <th style="width: 80%;"></th> <th style="width: 10%;">Y</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	X		Y																<p style="text-align: center;">2. $y = x + 3$</p> <table border="1" style="width: 100%; border-collapse: collapse; height: 100px;"> <thead> <tr> <th style="width: 10%;">X</th> <th style="width: 80%;"></th> <th style="width: 10%;">Y</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	X		Y																<p style="text-align: center;">3. $y = \frac{1}{2}x$</p> <table border="1" style="width: 100%; border-collapse: collapse; height: 100px;"> <thead> <tr> <th style="width: 10%;">X</th> <th style="width: 80%;"></th> <th style="width: 10%;">Y</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	X		Y															
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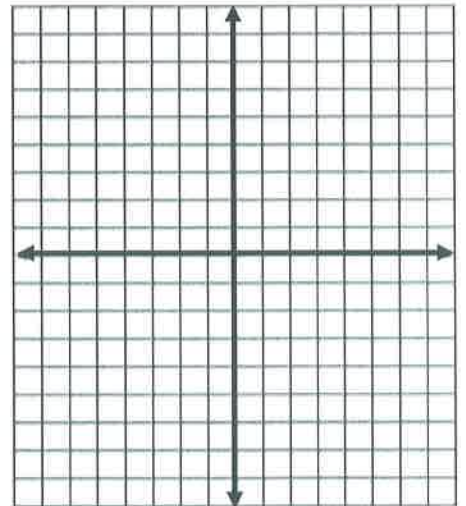
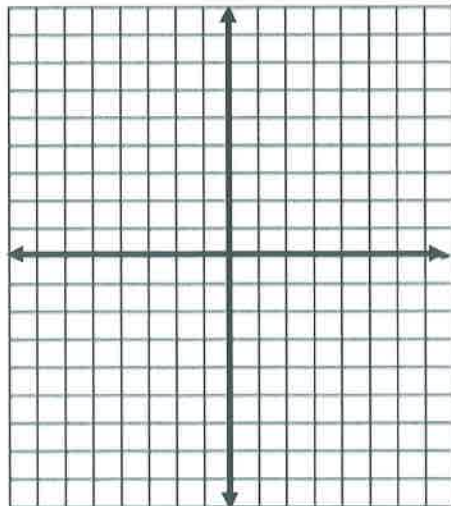
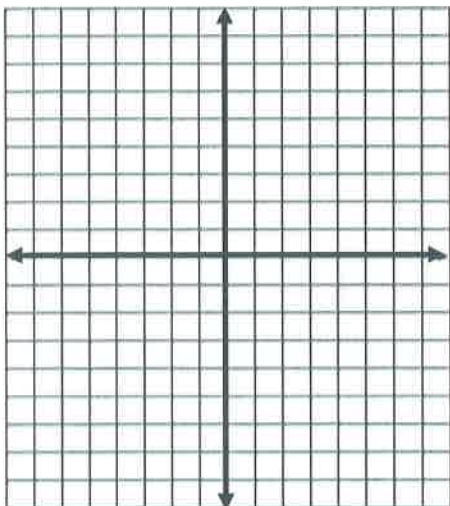
T3-2 Graphing with Tables RETAKE PROBLEMS

First, plug in the x-values to complete the coordinate point.

Second plot points on the graphs below. There will be two lines graphed on each grid.

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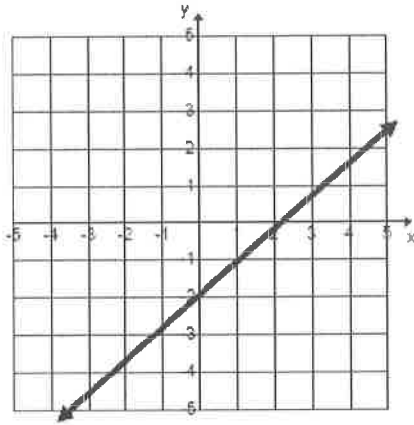


T3-3 Interpreting the x and y intercepts

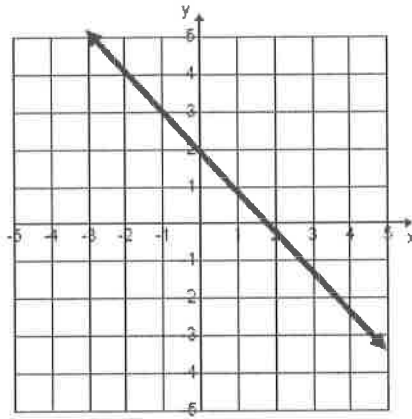
Name/Per: _____

Find and identify the x and y intercepts and write them as an ordered pair.

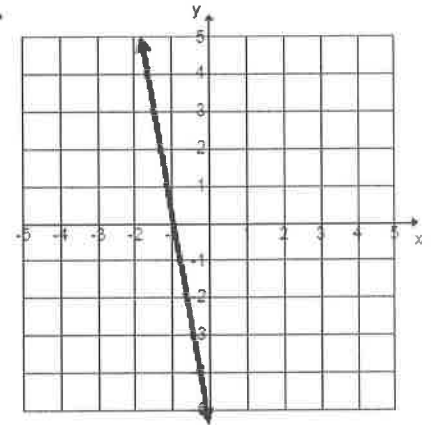
1.



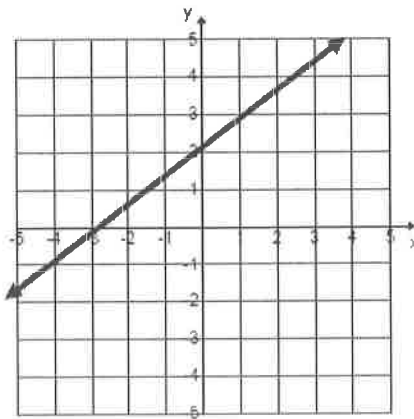
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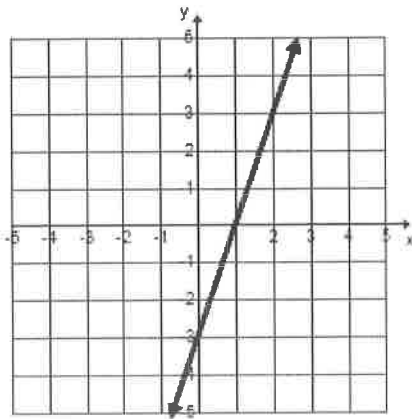
3.



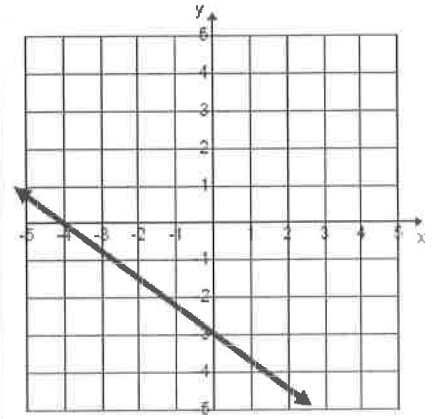
4.



5.



6.

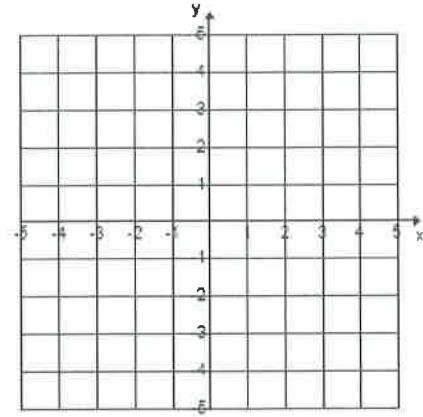


T3-3 Interpreting the x and y intercepts

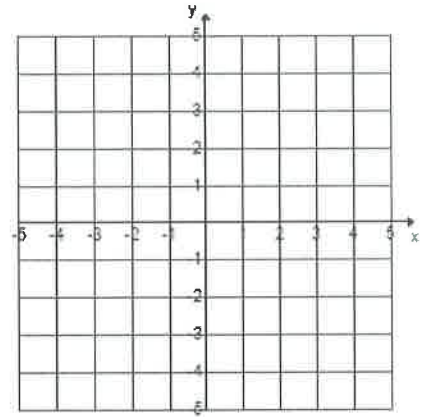
Name/Per: _____

Find and graph the intercepts of the following linear equations.

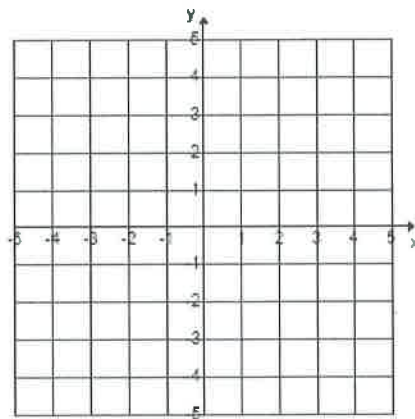
1. $x + y = 8$



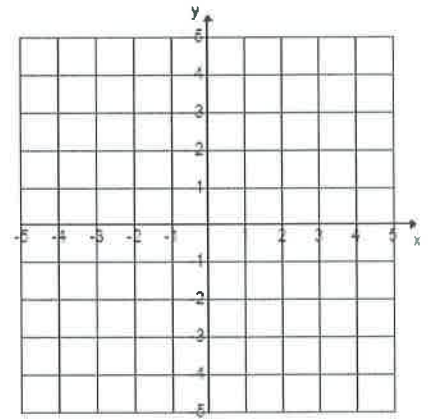
2. $2x + 3y = 12$



3. $4x - y = -8$



4. $5x - 2y = -10$

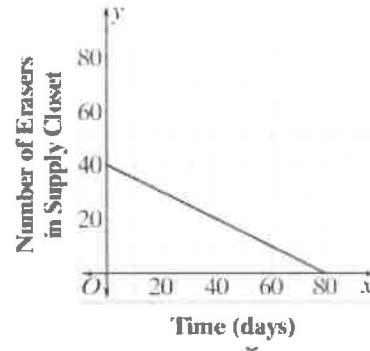


1. If the x-intercept of a line is positive and the y-intercept is negative, does the line slant upward or downward from left to right? Explain your reasoning.
2. A student says that the x-intercept of the graph $x + 2y = 5$ is the point $(0, 5)$. Why is the student incorrect?
3. At which point does the graph of the equation $2x + y = 4$ cross the x-axis?

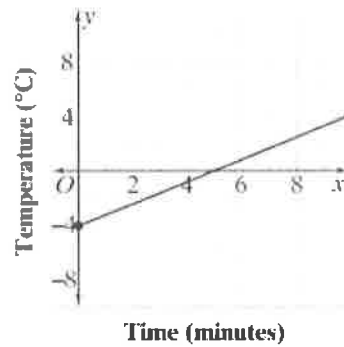
T3-3 Interpreting the x and y intercepts

Name/Per: _____

- At the beginning of each school year, Principal Sao stocks the teachers' supply closet with new erasers. The graph below shows the change in number of erasers in the supply closet over time. Find the x- and y-intercepts of the graph. Explain what each intercept means in the context of the problem.



- The graph represents the relationship between time and temperature. Find the x- and y-intercepts, and explain what they mean in the situation.



- The equation $y = -4x + 100$ represents the relationship between total score on a quiz, y , and questions counted incorrect, x . Find the intercepts of the equation, and explain what they mean in the situation.

- Jules has a gas card for a local gas station. The table shows the function relating the amount of money on the card and the number of times he has stopped to purchase gas. Find the intercepts of this function and explain what they mean in this situation.

Number of Gas Stops	Amount of Money (\$)
0	125
1	100
2	75
3	50
4	25
5	0

T3-3 Interpreting the x and y intercepts

Name/Per: _____

Answers:

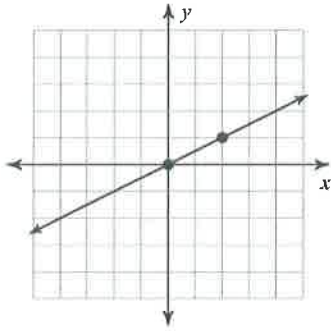
1. The y-intercept, $(0, 40)$, shows how many erasers are in the closet when time equals 0, or when Principal Sao first stocks the supply closet. So, the original number of erasers was 40. The x-intercept, $(80,0)$, shows the time that has passed when the number of erasers in the closet is 0. So, it takes 80 days to run completely out of erasers.
2. The y-intercept, $(0, -4)$, shows the original temperature when time was 0, so the chemical was -4 degrees Celsius at the beginning of the experiment. The x-intercept, $(5,0)$, shows the time that has passed when the temperature is 0. So when five seconds have passed the temperature of the chemical is 0 degrees Celsius.
3. The y-intercept, $(0, 100)$, shows that if you answered zero questions incorrect you would have scored 100. The x-intercept, $(25,0)$, means that if you miss 25 questions you will score 0 points.
4. The y-intercept $(0, 125)$, shows that before any stops were made Jules has \$125 on his card. The x-intercept $(5, 0)$ shows that after 5 stops, Jules has no more money on the card.

T3-4 WRITING IN SLOPE INTERCEPT FORM RETAKE PROBLEMS

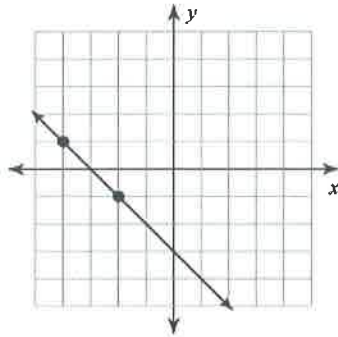
First determine the slope and y intercept for the following graphs.

Second write an equation for the line in slope intercept form. ($y = mx + b$)

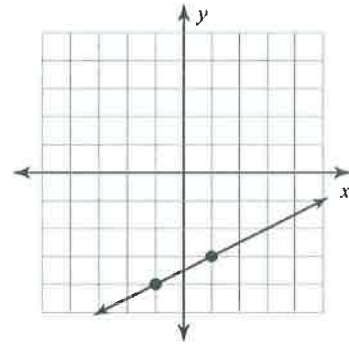
1. Slope: _____
y-intercept: _____
Equation: _____



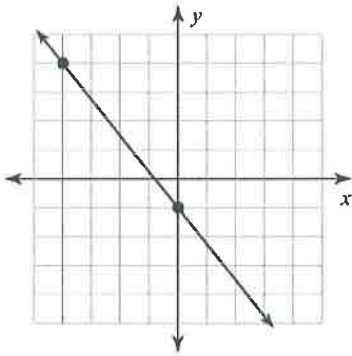
2. Slope: _____
y-intercept: _____
Equation: _____



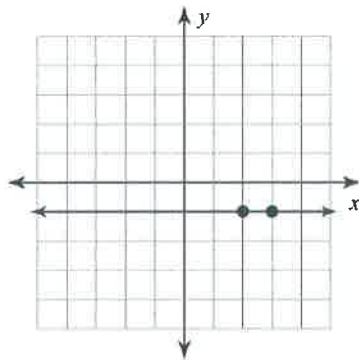
3. Slope: _____
y-intercept: _____
Equation: _____



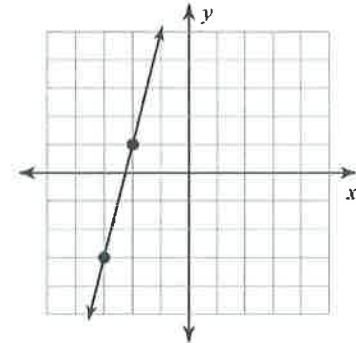
4. Slope: _____
y-intercept: _____
Equation: _____



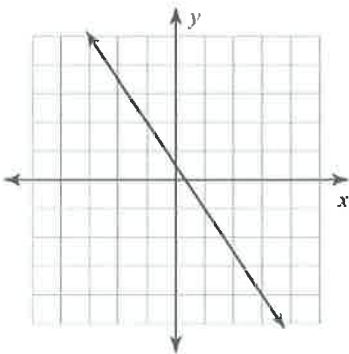
5. Slope: _____
y-intercept: _____
Equation: _____



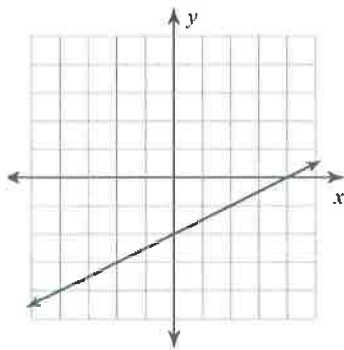
6. Slope: _____
y-intercept: _____
Equation: _____



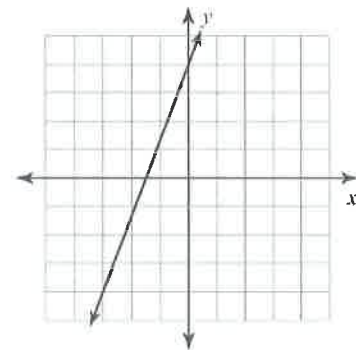
7. Slope: _____
y-intercept: _____
Equation: _____



8. Slope: _____
y-intercept: _____
Equation: _____



9. Slope: _____
y-intercept: _____
Equation: _____



T3-4 WRITING IN SLOPE INTERCEPT FORM RETAKE PROBLEMS

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

10. Slope = -1, y-intercept = 2

11. Slope = $\frac{3}{2}$, y-intercept = 3

12. Slope = 3, yintercept = -2

13. Slope = $\frac{3}{4}$, y-intercept = 1

14. Find the slope between (0, 3) and (-4, -1), the use the y-intercept of 10 to write and equation in slope intercept form.

15. Fine the slope between (-4, -2) and (-3, 5), then use the y-intercept of -4 to write and equation in slope intercept form.

16. Fine the slope between (5, 4) and (-4, 3), then use the y-intercept of -4 to write and equation in slope intercept form.

17. Given the following table write and equation in slope intercept form. Find the slope and y-intercept in the table.

X	Y
4	3
2	-1
0	-5
-2	-9

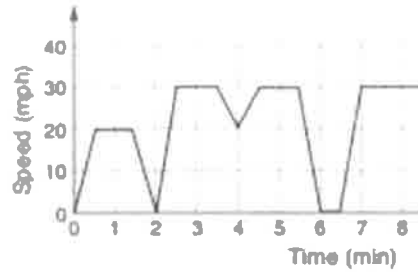
18. Given the following table write and equation in slope intercept form. Find the slope and y-intercept in the table.

X	Y
0	48
12	44
24	40
36	36

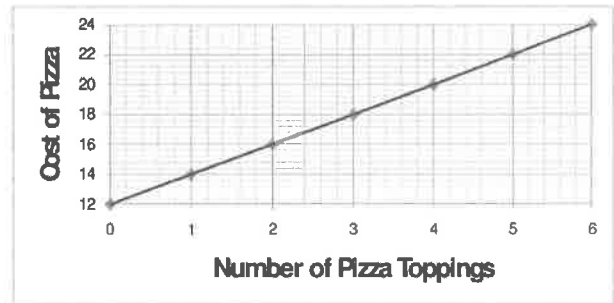
T3-5 Independent and Dependent Variable Retake Problems

Identify the independent and dependent variables for each relation, then describe what is happening in each graph. Describe what the x and y intercepts mean in context to the problem.

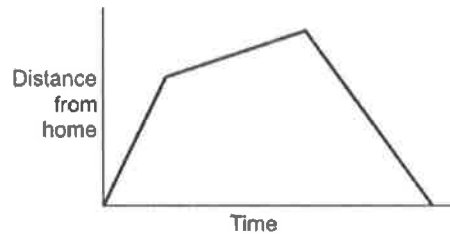
1. The graph represents the speed of a car as it travels to the grocery store.



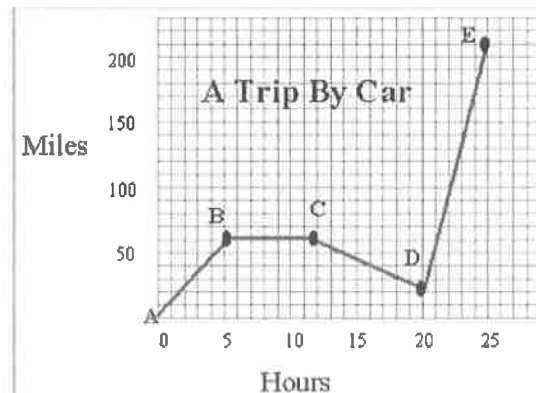
2. The graph represents the cost of Pizza for a family when the kids keep adding toppings to the pizza.



3. The graph represents the time it takes Sally to walk to school in the morning.



4. The graph represents the amount of miles the Lewis family had to drive in a certain amount of time to make it to their destination.



T3-5 Independent and Dependent Variable Retake Problems

Sketch a graph for the following situations. Identify the independent and dependent variables. Then explain what the x and y intercepts mean in context to the problem.

- a. I started to walk to class, but I realized I had forgotten my notebook, so I went back to my locker and then I went quickly at a constant rate to class.

- b. The height of a basketball that is dribbled three times before it is shot at the hoop and then returns to the ground.

- c. Bob walks down a stair case at a constant speed until he reaches the halfway mark, he paused for a second then realized he forgot to turn off the light up stairs. Walks back up the stairs, then races the dog back down the stairs.

- d. My dad drove me to school this morning. We started off by driving for 10 minutes at about 30 miles per hour. We stopped at a stoplight for 2 minutes, and then drove on at 20 mph for about 5 minutes. We got on the expressway and drove at 50 mph for about 30 minutes. We got off the expressway and stopped at a stop sign for a minute. Then we drove into the schoolyard and stopped.