# Linear Equations Revisited

Math 8

**Four Important Formulas:**

**Slope:** $m = \frac{y_2 - y_1}{x_2 - x_1}$ **Slope-Intercept Form:** $y = mx + b$

**Standard:** $Ax + By = C$ **Point-Slope:** $y - y_1 = m(x - x_1)$

**You should be able to convert equations easily.**

**Example:**
Convert to slope-intercept form.

**1.** $2x - 5y = 10$

**Practice:** Convert to slope-intercept form.

**1.** $2x + y = 7$ **2.** $2x - 3y = 15$ **3.** $5x - y = -4$

**Example:** Convert to Standard form.

**1.** $y = \frac{1}{3}x - 4$

**Practice:** Convert to Standard form.

**1.** $y = -2x + 23$ **2.** $y = -\frac{4}{3}x - \frac{1}{3}$ **3.** $y = 2.3x - 4.5$

Name_____ Period _____

# Slope-Intercept and Standard Form

Math 8

**Convert Each into Slope-Intercept Form**

**1.** $x-3y=-9$

slope: _____

y-int. _____

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

slope: _____

y-int. _____

**3.** $x-9y=18$

slope: _____

y-int. _____

**4.** $2x-7y=21$

slope: _____

y-int. _____

**5.** $x+9=3y$

slope: _____

y-int. _____

**6.** $3y=2x-15$

slope: _____

y-int. _____

**7.** $5y-2x=-30$

slope: _____

y-int. _____

**8.** $2x-12=4y$

slope: _____

y-int. _____

**9.** $\frac{y-2}{3}=x$

slope: _____

y-int. _____

**10.** $\frac{3}{4}y=x-6$

slope: _____

y-int. _____

Name_____ Period _____

# Slope-Intercept and Standard Form

Math 8

**Convert Each into Standard Form. List -A/B and C values.**

**11.** $y = -2x + 5$

Equation: _____

-A/B: _____

**12.** $y = 5x - 7$

Equation: _____

-A/B: _____

**13.** $y = -\frac{2}{3}x - 3$

Equation: _____

-A/B: _____

**14.** $y = \frac{3}{5}x - 1$

Equation: _____

-A/B: _____

**15.** $y = -\frac{1}{2}x + 4$

Equation: _____

-A/B: _____

**16.** $y = -3x$

Equation: _____

-A/B: _____

**17.** $y = -3.2x + 4$

Equation: _____

-A/B: _____

**18.** $y = \frac{2}{3}x - \frac{1}{2}$

Equation: _____

-A/B: _____

# Linear Equations Revisited

Math 8

**If you can convert equations easily, you can answer questions about the points, slopes, and intercepts of linear equations.**

**Practice:** Solve.

**1.** What is the slope of the equation $5x-4y=20$ ?

**2.** What is the y-intercept of the equation $x-2y=6$ ?

**3.** Which of the following equations has a slope of 2/3 and a y-intercept of 4?

**A.** $2x+3y=12$ **B.** $2x-3y=-12$ **C.** $3x-2y=12$

**Graphs:**
You should also be able to recognize graphs and write equations for them.

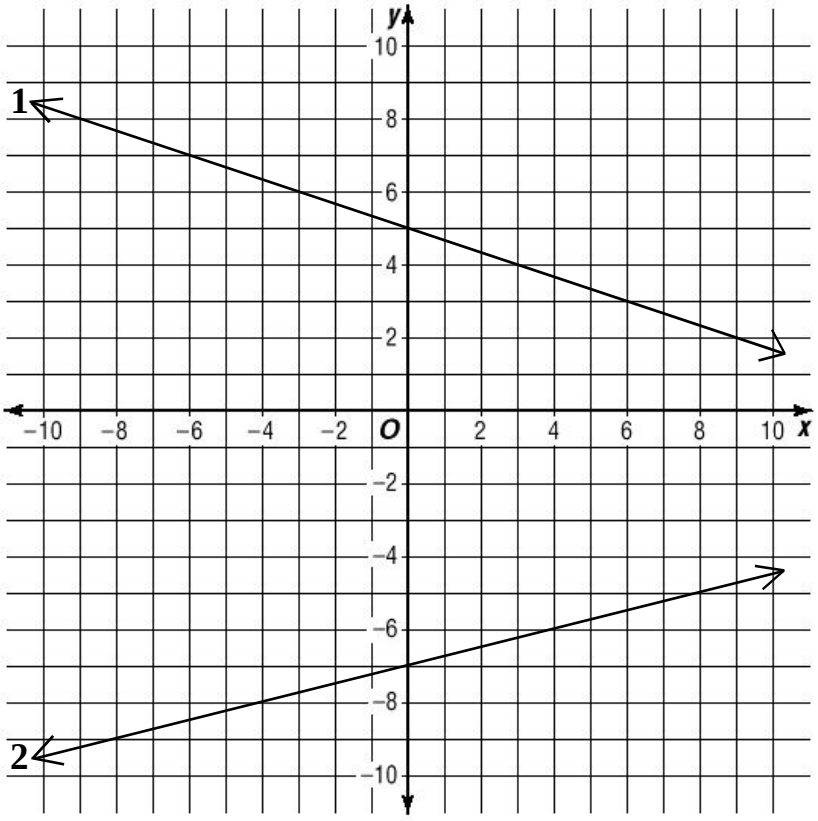
**Practice:** Solve.

**1.** Find the slope of each.

**2.** Write a slope-intercept form equation for each.

**3.** Convert each equation into Standard Form.

**4.** What is the x-intercept of each line?



# Intercepts Revisited

Math 8

**Intercepts:**
The x-intercept always occurs where y equals _____.
The y-intercepts always occurs where x equals _____.

**Set y=0 to find the x-intercept.**
**Set x=0 to find the y-intercept.**

**Examples:** Find the x and y-intercepts of each.
**This is the "coverup" method.**

1. $3x-y=12$ 2. $2x-5y=4$ 3. $2x-3y=8$

**Practice:** Find the x and y-intercepts of each.

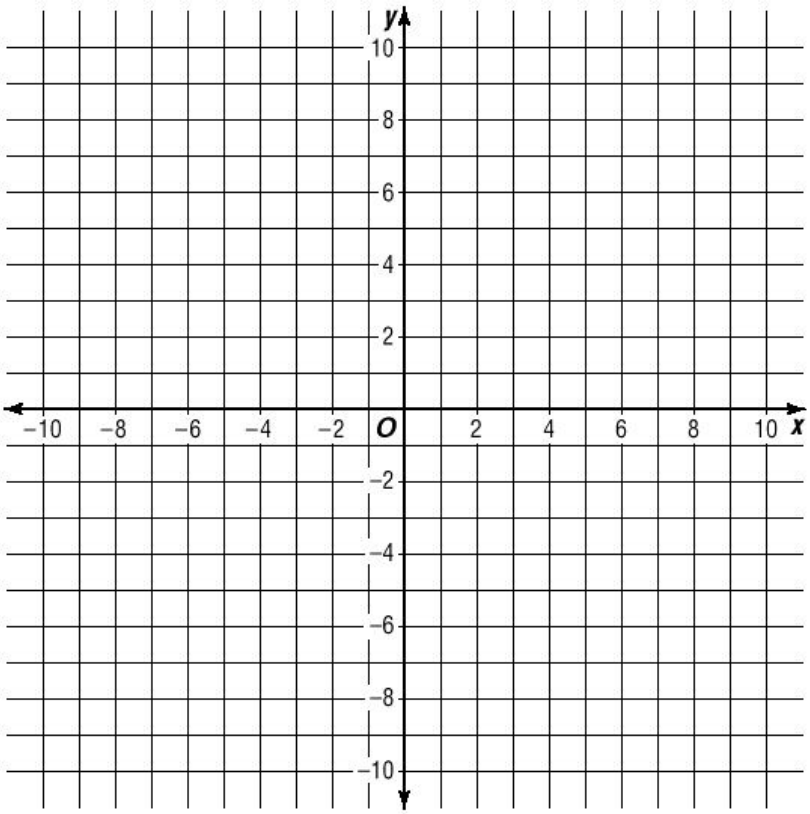
1. $5x+3y=30$ 2. $x-7y=11$ 3. $\frac{3}{4}x-\frac{2}{3}y=7$

**Practice:** Graph each of the following using the intercepts:

1. $5x-3y=15$

2. $2x-y=8$

3. $x-3y=9$



Name_____ Period _____

# Standard Form and Intercepts

Math 8

**Determine the x and y-intercepts for each equation below. Convert to Standard Form where necessary.**

**1.** $x-3y=-9$

x-int.: _____

y-int. _____

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

x-int.: _____

y-int. _____

**3.** $x-9y=7$

x-int.: _____

y-int. _____

**4.** $2x-7y=3$

x-int.: _____

y-int. _____

**5.** $x+9=3y$

x-int.: _____

y-int. _____

**6.** $3y=2x-5$

x-int.: _____

y-int. _____

**7.** $y=2x-3$

x-int.: _____

y-int. _____

**8.** $2x-12=4y$

x-int.: _____

y-int. _____

**9.** $\frac{y-2}{3}=x$

x-int.: _____

y-int. _____

**10.** $\frac{3}{4}y=x-5$

x-int.: _____

y-int. _____

**11.** $y=\frac{x-9}{5}$

x-int.: _____

y-int. _____

**12.** $\frac{1}{2}y=\frac{2}{9}x-\frac{1}{3}$

x-int.: _____

y-int. _____

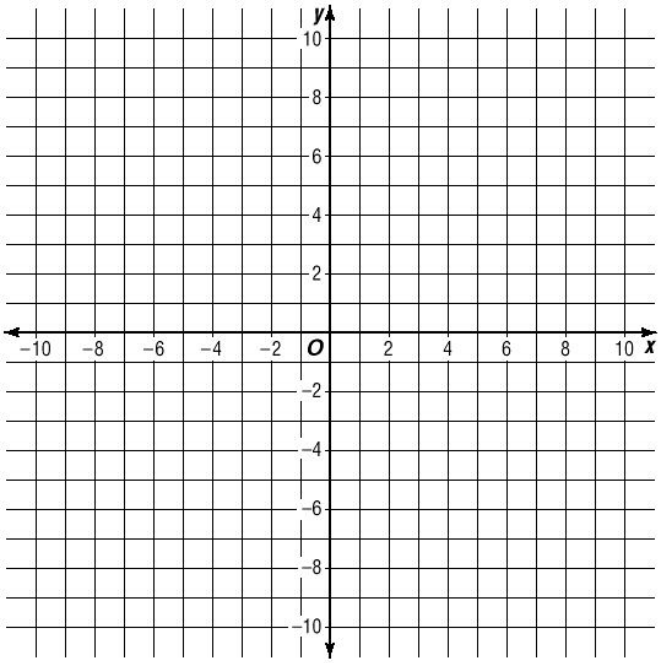
Name_____ Period _____

# Standard Form

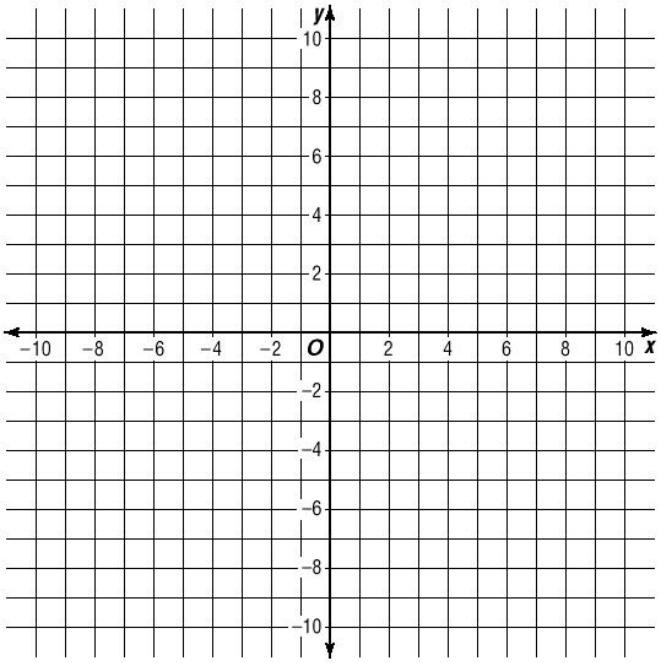
Math 8

Graph each equation below using the intercepts.
Connect the intercepts. Intercepts are all whole numbers.

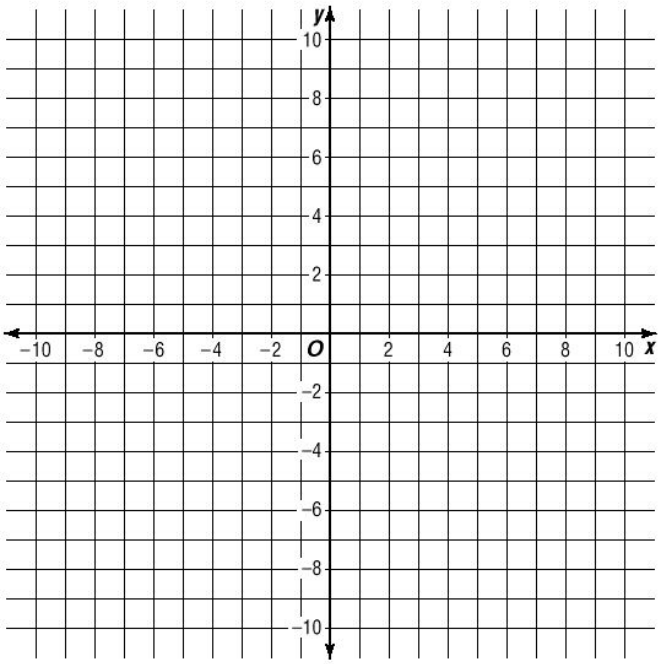
**13.** $x + 2y = 6$



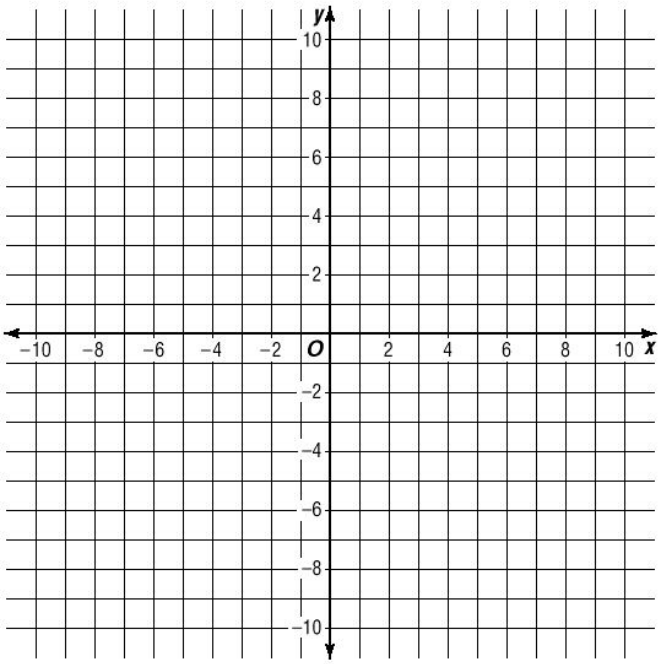

**14.** $6x - 3y = -12$




**15.** $3x - y = 6$




**16.** $x - 2y = -10$



# Points and Equations

Math 8

**Points are all you need to determine the equation of a line. This can be done many ways.**

**Example:**
Match each point below with the equation of the line that passes through it.

**1.** $(2,-1)$ **2.** $(-1,-2)$ **3.** $(-1,2)$ **4.** $(-2,1)$

**A.** $3x-y=-5$ **B.** $2x-5y=9$ **C.** $2x-3y=4$ **D.** $2x-5y=-9$

**If you are given two points, you can write an equation of a line.**

**Example:**
Find the equation in slope-intercept form of the line which passes through the following points:

$(2,-7)$ and $(-4,-10)$

1. Find the slope.
2. Plug the slope into slope-intercept form and solve for the intercept (b).

**Practice:** Write an equation in slope-intercept form for each:

**1.** A line with a slope of $-2$ which passes through the point $(2,-1)$.

**A.** $y=-2x+1$ **B.** $y=-2x+2$ **C.** $y=-2x+3$

**2.** A line with a slope of $\frac{2}{3}$ which passes through the point $(6,-7)$.

**3.** A line which passes through $(4,-3)$ and $(-6,-8)$.

Name_____ Period _____

# Points and Equations

Math 8

**Practice:** Find the slope given each pair of points.

**1.** $(2,5)(4,6)$

slope: _____

**2.** $(-2,-3)(5,-1)$

slope: _____

**3.** $(4,-1)(19,4)$

slope: _____

**4.** $(-3,0)(-5,-2)$

slope: _____

**5.** $(6,11)(2,1)$

slope: _____

**6.** $(-31,15)(11,-6)$

slope: _____

**Practice.** Write the slope-intercept form equation for each:

**7.** A line with a slope of -3 that passes through (-4, 5).

7. _____

**8.** A line which has a slope of 1/2 and passes through (6, -1).

8. _____

**9.** A line that passes through (-6, -6) and (9, -1).

9. _____

Name_____ Period _____

# Points and Equations

Math 8

**Practice:** Each point on the right belongs with one of the equations on the left. Match each point with its proper equation.

_____ **10.** $3x - 2y = 7$

**A.** $(10,4)$

_____ **11.** $2x + y = 6$

**B.** $(-2,2)$

_____ **12.** $y = \frac{3}{5}x - 2$

**C.** $(-1,1)$

_____ **13.** $y = -2x - 3$

**D.** $(5,4)$

_____ **14.** $5x - 3y = -5$

**E.** $(-7,-10)$

_____ **15.** $2x - y = -6$

**F.** $(4,-2)$

_____ **16.** $3x - 5y = -8$

**G.** $(-4,-9)$

_____ **17.** $y = \frac{1}{2}x - 7$

**H.** $(-4,5)$

# Word Problems and Equations

Math 8

**Most linear equations are easy to translate into Algebra:**

**Example:** Tina mows lawns around her neighborhood. She charges a flat fee of $5, plus she charges $20 per hour for the time it takes for her to mow the lawn.

**A.** What equation could be used to represent the cost (c) of mowing based on the number of hours (h) it takes for her to mow the lawn?

**B.** If it takes an hour and a half to mow a lawn, how much does Tina charge?

**C.** Tina agrees to waive the flat fee for mowing your lawn (because you live next door), but she charges $24 per hour because your lawn is on a steep slope. If it takes Tina 45 minutes to mow your lawn, how much will it cost?

**D.** In part C, how much do you save compared to Tina's standard charges?

**Practice:** Write a slope-intercept form equation for each.

**1.** The cost of a phone call is $0.75 to connect and $0.07 per minute.

**2.** A babysitter charges $10 initially and $5 per hour.

**3.** Equipment at Putt-Putt costs $4 to rent, and is costs $5 per hour to play.

**Practice:**

Harry's lawn service collects leaves each fall for a fee. The charge is $15 to come to your house, and $1.50 per bag of leaves they remove.

**A.** What equation could be used to represent the cost (c) to remove leaves based on the number of bags (b) that are collected?

**B.** What is the cost to remove 20 bags of leaves?

**C.** If you paid $36 for leaf removal, how many bags of leaves were removed from your lawn?

**D.** In the spring, Harry reduces the initial fee to $5, but charges $2 per bag. If you want 22 bags of leaves removed, is it cheaper in the spring or the fall?

Name_____ Period _____

# Word Problems

Math 8

**Write an equation to represent each situation given below in the form listed. Convert each to the form listed.**

**1.** Tommy's Pizza Den charges $7 for a medium pizza plus $0.75 per additional topping.

Slope-Intercept Form: (use $c$ for charge and $t$ for toppings)

_____

Standard Form:

_____

**2.** A taxi ride in Boston costs $5.50 plus $0.40 for each 1/5 of a mile.

Slope-Intercept: ($c$ for cost and $m$ for miles ... remember to find the cost per *mile*)

_____

Standard:

_____

**3.** A long distance company charges a $0.80 connection fee, plus $0.12 a minute.

Slope-Intercept Form: (use $m$ for minutes and $c$ for charge)

_____

Standard Form:

_____

**4.** When pricing drinks at the convenience store, the manager charges $0.04 per ounce and $0.40 for the cup.

Slope-Intercept: (Use $n$ for ounces and $c$ for cost)

_____

What would be the price for a 32-ounce cup of soda?

_____

Name_____ Period _____

# Word Problems

Math 8

**Write an equation to represent each situation given below in the form listed. Answer the question that follows.**

**5.** The cost to produce a book depends on how many copies are printed. For 100-1000 copies, the printing cost of each book is $0.014 per page plus $5.00 for cover/binding.

Slope-Intercept Form:

_____

What would be the cost to print 500 books if each is 230 pages?

_____

**6.** To re-shingle the roof of a house, the initial fee is $250 and there is a charge of $2.30 per square foot of roof.

Slope-Intercept: ($c$ for cost and $f$ for $ft^2$)

_____

If it costs $3,010 to have your roof re-shingled, how many square feet of roof do you have? (Just plug-in $3010 for c in the equation above and solve for f).

_____

**7.** A rental car company charges $14.50 per day of rental plus $0.50 per mile. Write an equation below which uses d for days and m for miles to give you the cost (c) to rent a car from the company.

_____

**A.** If you rented the car for 4 days and drove 180 miles, what would you pay for the rental?

_____

**B.** If you rented the car for 7 days and were charged $206.50, how many miles did you drive the rental car?

_____

# Review: Linear Equations

Math 8

**Practice:**

State the slope of each using the given information.

**100.** $y = -\frac{2}{3}x - 5$

**200.** $5x - 3y = 18$

**300.** $(1,3)$ and $(5,13)$

**400.** $(2,-5)$ and $(-3,4)$

**500.** $x$-intercept: $-3$ $y$-intercept: $-7$

**Intercepts:** State the $x$ and $y$-intercepts of each:

**100.** $2x - 3y = 6$

**200.** $5x - 4y = 15$

**300.** $3y = 8x - 7$

**400.** $\frac{1}{2}x = \frac{3}{4}y - 5$

**500.** $2(x - y) = y - 5x$

**Practice:**

Bob's Pools maintains pools during the summer months. They come out once a week to clean and maintain your pool. They charge $18.95 each week plus an additional amount based on the pool's size equal to $10 per 5,000 gallons.

**100.** What is the weekly cost to maintain a 25,000 gallon pool?

**200.** Write an equation for the cost (c) based on the number of gallons (g). Remember to find the cost per gallon first!

**300.** David pays $55.95 per week to have his pool maintained. How many gallons of water are in his pool?

**400.** Bob waives the $18.95 fee for community pools larger than 150,000 gallons. How much *more* will it cost to service a 148,000 gallon pool than it will cost to service a 152,000 gallon pool?

Name_____ Period _____

# Practice Quiz: Linear Equations Rev.

Math 8

**State the slope of each using the given information:**

1. $(3,-2)\quad(9,-5)$

**1.** m= _____

2. $y=\frac{4}{5}x-7$

**2.** m= _____

3. $2x-7y=9$

**3.** m= _____

4. $\frac{2}{3}x=\frac{1}{2}y-4$

**4.** m= _____

**State the y-intercept of each equation below:**

5. $y=4x-1$

**5.** y-int. _____

6. $x-y=3$

**6.** y-int. _____

7. $\frac{1}{2}x+\frac{1}{3}y=5$

**7.** y-int. _____

8. $x-2=\frac{1}{2}y$

**8.** y-int. _____

Name_____ Period _____

# Practice Quiz: Linear Equations Rev.

Math 8

**Write an equation in slope-intercept form using the information given**

**9.** Slope: $\frac{1}{2}$ Passing through: $(6,-1)$

**9.** $y =$ _____

**10.** Passing through: $(-2,3)$ and $(5,-11)$

**10.** $y =$ _____

**11.** Slope: $\frac{2}{3}$ Passing through: $(-6,-2)$

**11.** $y =$ _____

**Solve each:**

**12.** Convert to standard form (Ax+By=C): $y = \frac{2}{5}x - 4$

**12.** _____

**13.** Megan babysits the Taylor twins for $5.50 an hour and usuallly gets a $5 tip. Write an equation for the amount Megan charges (c) for babysitting the twins based on the number of hours (h) she works.

**13.** _____

**14-16.** Tom's tow company charges $15 to come get your car and $1.25 per mile to transport it.

**14.** How much will it cost to have Tom come get you and tow your car 14 miles?

**14.** _____

**15.** You have $40. How far can you have Tom tow your car?

**15.** _____

**16.** What equation could be used to represent the cost of towing your car if Tom increases his rate per mile by 5 cents?

**16.** _____

**17.** Most salespeople earn money based on *commission*. Earl is a salesman who earns $10,000 per year plus an amount equal to 6% of his total sales. Write an equation for Earl's yearly earnings (e) based on his total sales (t)?

**17.** _____