You may use your (completed) equations book on the test! ☺

Review

Unit 4: Linear Functions

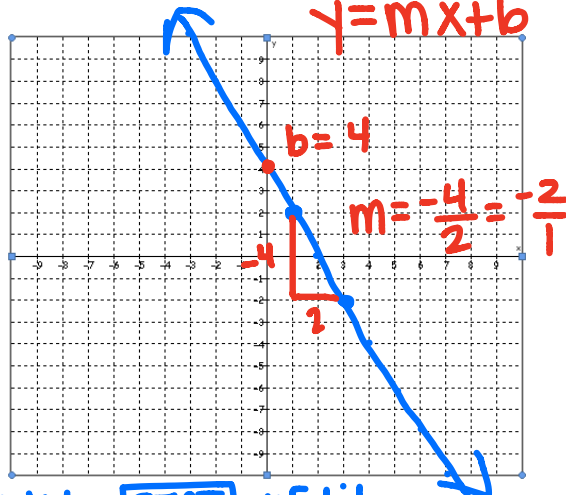*(mid unit)*

Name **Key**

Date _____ Period _____

1. Which equation best represents the graph shown below?
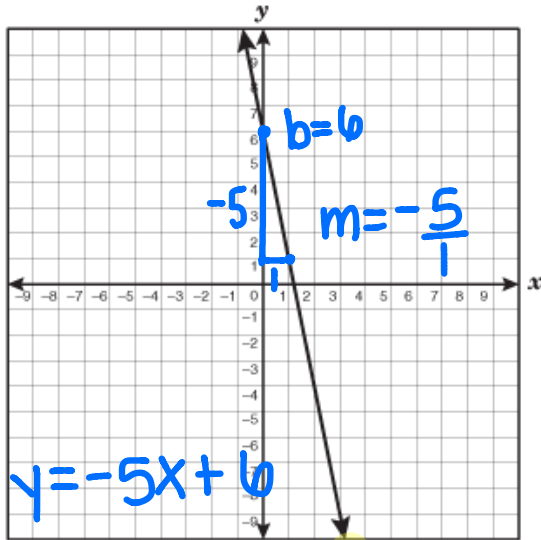
b=6

-5   *m = -5/1*

y = -5x + 6

~~A~~ $y = 5x + 6$

~~B~~ $5x - y = 6$ *5x - y = 6*
                          -5x   -5x
                          -y = -5x + 6
                          ─── = ── + ──
                          -1   -1   -1
C $y - 6 = -5x$ *y = 5x - 6 ☹*

~~D~~ $y - 1 = 5(x - 1)$
      point (1,1) ✓
      m = 5 ✗

2. Write a linear function that includes the points (1, 2) and (3, -2) in slope-intercept form.

y = mx + b

b = 4

m = -4/2 = -2/1

OR

x	y
1	2
3	-2

STAT 1:Edit...
x's→L₁, y's→L₂
STAT ▷ CALC
4:LinReg

y = -2x + 4

3. Alex and Millie are selling kites from their store near the beach. Each day more people stop to look at and buy the kites. Alex and Millie kept the following record comparing the number of customers that stopped to look at their kites to the amount of money they collected in sales each day.

Number of Customers	12	18	24	30
Amount of Sales (dollars)	180	210	240	270

A) Write the equation that represents this situation. *STAT !*

   y = 5x + 120

B) If this trend continues, how many customers will need to stop and look at Alex and Millie's kites in order for their sales in one day to reach $420? *y = 420*
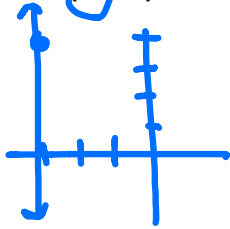
   A   48
   B   54
   C   60
   D   66

   420 = 5x + 120
   -120   -120
   ─────────────────
   300 = 5x
   ─── = ──
   5   5

4. Write an equation in slope-intercept form

x	y
-14	18
-7	15
7	9

y = -3/7 x + 12

–

5. Write the equation of a line passing through (-3, 4) with an underlined slope. **VUX**

vertical!

$$X = -3$$

6. Which equation represents the linear function represented in the table below.

x	y
0	3
10	5
15	6

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

A. $x - 5y = -15$ → $10 - 5(5) = -15$ ✓
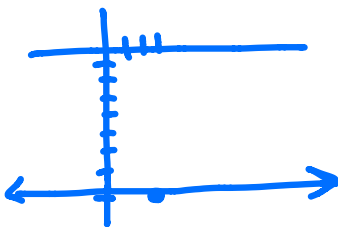
B. $x - 5y = -3$

C. $x + 5y = -15$ → $10 + 5(5) = 35$

D. $x + 5y = -3$

All choices in standard form. Plug in point (x,y) and check!

7. Write the equation of a line passing through the point (3, -8) and a slope of zero. **HOY**

$$Y = -8$$

8. Dara is going to visit a college campus before deciding where she will attend. She left her house at 12PM. At 1 o'clock, she is 300 miles from her destination. Two hours later, she is 180 miles from the college. +2

A. What is the y-intercept of the line and what does it represent in this situation?

time distance

X	Y
1	300
3	180

(0, 360)

She begins 360 miles away from her destination.

B. What is the slope of the line and what does it represent in this situation?

X	Y
1	300
3	180

+2 → -120

$$m = \frac{\Delta y}{\Delta x} = \frac{-120}{2} = -60 \text{ mph}$$

She travels 60 miles every 1 hour.

C. What is the equation for this situation?

$$y = -60x + 360$$

9. The number of teachers, t, at Richardson High School varies directly with the number of teachers in RISD, r. If the number of teachers at Richardson High School is 300 and the total number of teacher in RISD is 1,000, write an equation that describes the relationship between t and r.
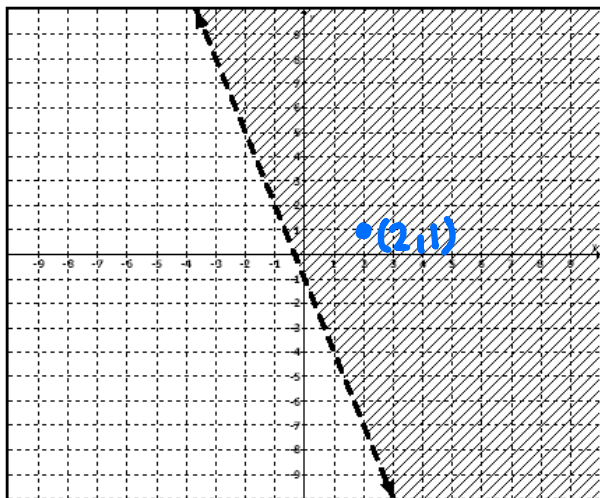
A) t = 0.3r
B) r = 0.3t
C) t = 3r
D) r = 3t

$$y = kx \Rightarrow k = \frac{y}{x} = \frac{t}{r}$$

$$= \frac{300}{1000} = 0.3$$

t   r

variation:
· 2 #s → use equation
· 3 #s → use WON chart

10. Which inequality represents the following graph?

• (2,1)

~~A.~~ $3x + y < -1$ $3(2)+1 \not< -1$

B. $3x + y > -1$

~~C.~~ $-3x + y \leq -1$ ⟩ line is dotted!

~~D.~~ $3x + y \geq -1$

All standard form: test solution points (not on dotted lines)

11. Write an equation of a line that has a slope of $m = \frac{3}{4}$ and that passes through the point (6, -1)
                           x_1 y_1

Given: point & slope
Use: $y - y_1 = m(x - x_1)$

$$y - -1 = \frac{3}{4}(x - 6)$$

$$\boxed{y + 1 = \frac{3}{4}(x - 6)}$$

12. The members of a school choir had a fundraising drive last month. They sold candy bars for $2 each and cans of popcorn for $5 each. Derek sold more than $300 worth of candy and popcorn altogether. Which of the following points could not reasonably represent the number of candy bars, x, and cans of popcorn, y, sold by Derek last month?

check answer choices! $2x + 5y > 300$

A. (30, 90)   A. $2(30) + 5(90) = 510$ ✓
B. (40, 80)   B. $2(40) + 5(80) = 480$ ✓
C. (20, 50)   C. $2(20) + 5(50) = 290$ ☹
D. (50, 60)   D. $2(50) + 5(60) = 400$ ✓

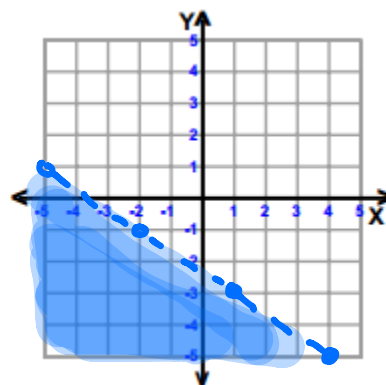13. What is the rate of change of the function $y - 2 = -8(x - 4)$?

$y - y_1 = \boxed{m}(x - x_1)$ ↑ SLOPE (m)

$$\boxed{-8}$$

14. Graph the following inequality:

$y - y_1 = m(x - x_1)$

$y + 5 < -\frac{2}{3}(x - 4)$ • Point: (4, -5)
                     • $m = -\frac{2}{3}$

• Dotted Line
• Shade DOWN

15. Which of the points are <u>solutions</u> to the equation $5x - y = 7$?

$-5x \mid -5x$

$-y \stackrel{?}{=} -5x + 7$

$\dfrac{-y}{-1} = \dfrac{-5x}{-1} + \dfrac{7}{-1}$

$y = 5x - 7$

   I.   (-2,-17) ✓
  ✗ II. (-7,0)
  ✗ III. (0.5,-9.5)
   IV. (0.5, -4.5) ✓

I & IV

[2nd] [GRAPH]
→ [2nd] [WINDOW]
to change where table starts

16. What is the value of y in the equation $7x - 3y = 21$ when x = 6?

$7(6) - 3y \stackrel{?}{=} 21$

$42 - 3y \stackrel{?}{=} 21$

$-42 \qquad -42$

$\dfrac{-3y}{-3} = \dfrac{-21}{-3}$

$\boxed{y = 7}$

17. What is the x-intercept of $-4y = 3x - 12$?

$y = 0$

"cover up" y

$\boxed{(4,0)}$

$0 \stackrel{?}{=} 3x - 12$

$+12 \qquad +12$

$\dfrac{12}{3} = \dfrac{3x}{3}$

$4 = x$

18. David is going to a fun center, and it costs $4 to ride bumper boats, x, and $6 to ride go-karts, y. He has $32 to spend. What is the <u>y-intercept</u> of this situation and what does it represent?

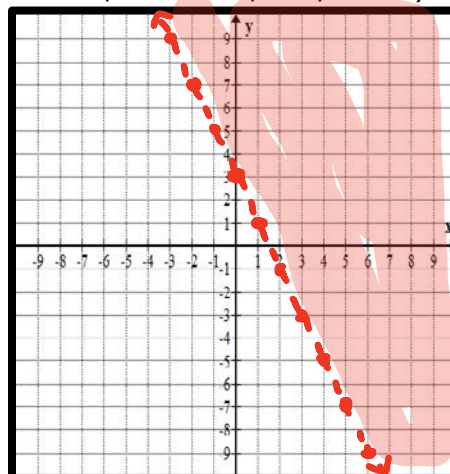$\dfrac{4x}{6} + \dfrac{6y}{6} = \dfrac{32}{6}$

y-int →
cover up x

$y = 5.3\overline{3}$ (0, 5.33)

David can ride go-karts 5 times if he doesn't ride the bumper boats.

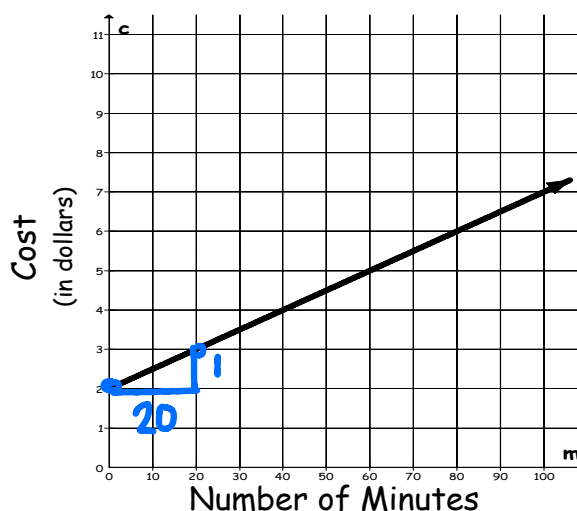**19.** Graph the inequality $8x + 4y > 12$.

Solve for y

$8x + 4y > 12$

$-8x \qquad -8x$

$\dfrac{4y}{4} > \dfrac{-8x}{4} + \dfrac{12}{4}$

$y > -2x + 3$

$m = -\dfrac{2}{1} \quad b = 3$

dotted, up

※ only flip the sign if you divide by a negative.

20. The graph below represents the cost of a long distance phone call with a phone company based on the number of minutes.

Cost (in dollars)

Number of Minutes

Based on the graph, what is the slope and what does it represent?

$m = \dfrac{\Delta y}{\Delta x} = \dfrac{1}{20}$ ← cost
                   ← minutes

It costs $1 for every 20 minutes for a long distance call.