Chapter 6 Linear Functions
Extra PRACTICE

Name:_____   Date:___ ☆Key☆___
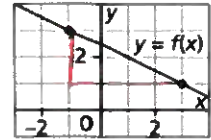
B **1).** What is the slope of this line on the right ?

  A. -2 **B.** $-\dfrac{1}{2}$ **C.** $\dfrac{1}{2}$ **D.** 2

$y = f(x)$

2). Which equation is **not** equivalent to the others?

A **A.** $y - 8 = -\dfrac{3}{2}(x + 8)$ **B.** $y = -\dfrac{3}{2}x + 4$ **C.** $3x + 2y - 8 = 0$ **D.** $y + 2 = -\dfrac{3}{2}(x - 4)$

$y - 8 = -\tfrac{3}{2}x - \tfrac{24}{2} + 8$ $y = -\tfrac{3}{2}x - 12 + 8$
$y = -\tfrac{3}{2}x - 4$

$\dfrac{2y}{2} = \dfrac{-3x + 8}{2}$
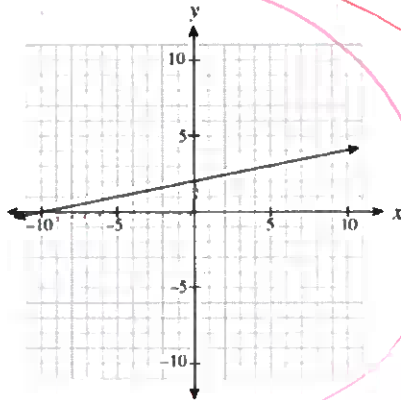
$y = -\dfrac{3x}{2} + 4$

$y + 2 = -\tfrac{3}{2}x + \tfrac{12}{2} - 2$
-2
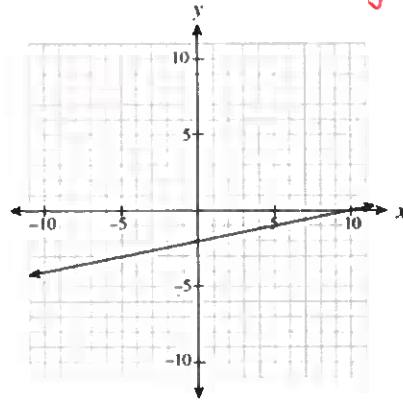
$y = -\tfrac{3}{2}x + 6 - 2$

$y = -\tfrac{3}{2}x + 4$

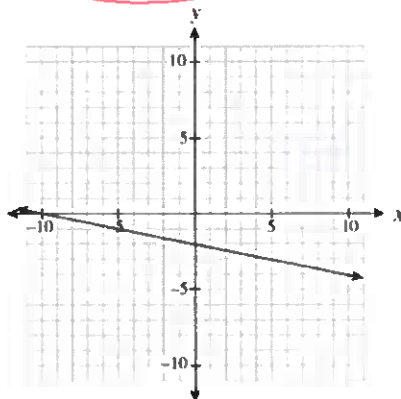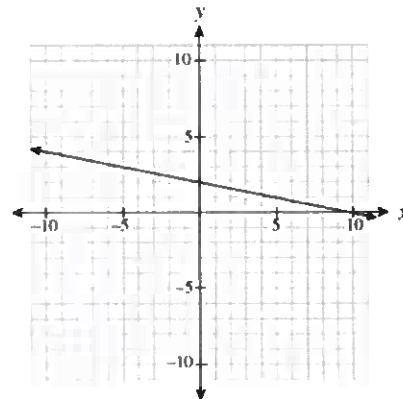**3).** Which graph represents the relation $x - 5y + 10 = 0$?

A.

B.

C.
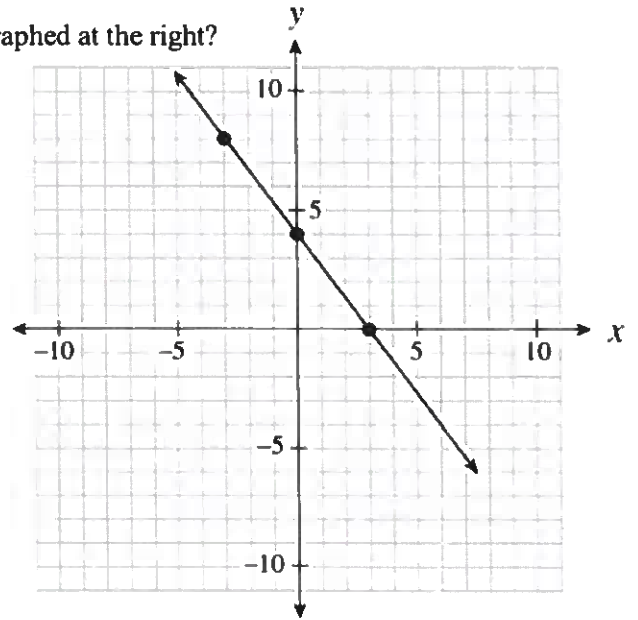

D.

$x - 5y + 10 = 0$

$\dfrac{-5y}{-5} = \dfrac{-x - 10}{-5}$

$y = \tfrac{1}{5}x + 2$

4). Which of the following equations describes the linear relation graphed at the right?

[handwritten: positive slope]

I.	$y = \frac{4}{3}x + 4$ *[handwritten: ✗]*
II.	$y - 8 = -\frac{4}{3}(x + 3)$ *[handwritten: ✓]*
III.	$4x + 3y - 12 = 0$ *[handwritten: ✓]*

[handwritten: D]

[handwritten work:
$y - 8 = \frac{-4x}{3} - 4$
$\quad +8 \qquad\qquad +8$
$y = -\frac{4}{3}x + 4$

$\frac{3y}{3} = \frac{-4x + 12}{3}$
$y = -\frac{4}{3}x + 4$ *]*

A). II only
B). I and II only
C). I and III only
D). II and III only *[circled]*

5). Determine the equation of a line, in slope-intercept form, that passes through the points $(6,1)$ and $(-10,9)$.

A). $y = -\frac{1}{2}x + 4$ *[circled]*

[handwritten: A]

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

C). $y = -2x + 8$

D). $y = -2x + 13$

[handwritten work:
$m = \frac{y_2 - y_1}{x_2 - x_1}$
$= \frac{9 - 1}{-10 - 6} = \frac{8}{-16} = -\frac{1}{2}$

$y - 1 = -\frac{1}{2}(x - 6)$
$y - 1 = -\frac{1}{2}x + 3$
$\quad +1 \qquad\qquad +1$
$y = -\frac{1}{2}x + 4$ *]*

6). Which of the following relations could be produced by $y = \frac{2}{5}x - 6$?

I.	$2x - 5y - 30 = 0$ *[handwritten: ✓]*
II.	$\{(15, 0), (10, -2), (-5, -8), (-10, -10)\}$ *[handwritten: ✓]*
III.	*[graph]* *[handwritten: ✗]*

[handwritten: C]

[handwritten work:
I. $-5\left(-\frac{2}{5}x + y + 6 = 0\right)$
$2x - 5y - 30 = 0$

II. $y - 0 = \frac{2}{5}(x - 15)$
$y = \frac{2}{5}x - \frac{30}{5}$
$y = \frac{2}{5}x - 6$ *]*

[handwritten on graph: -negative slope]

A). I only
B). II only
C). I and II only *[circled]*
D). I, II, and III

7). A line with an undefined slope passes through the points $(-2,1)$ and (p,q).

Which of the following points could be (p,q)?

[handwritten: undefined is vertical line]

[handwritten: D]

A). $(1,0)$
B). $(0,1)$
C). $(0,-2)$
D). $(-2,0)$ *[circled]*

[handwritten: $\frac{y}{0}$ ← denominator to be 0 in undefined situation]

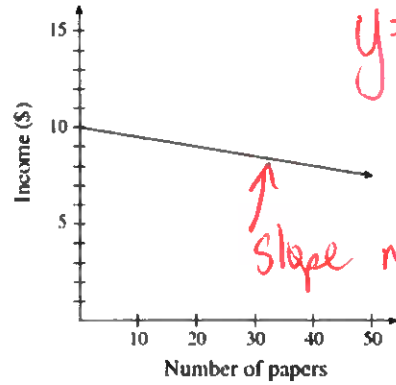*[handwritten: ⭐ x value will be the same.]*

8). Jim delivers newspapers. He gets paid 10 dollars for every day of work, plus 5 cents for every paper he delivers. Which of the following graphs best represents Jim's possible income for one day?
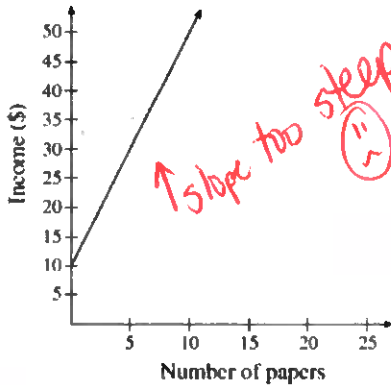
A.

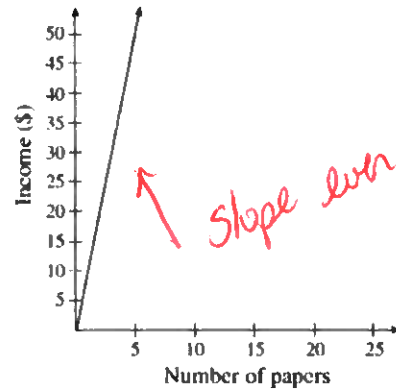*(Graph with Income ($) on y-axis from 5 to 15, Number of papers on x-axis from 10 to 50; line starting at 10 and rising slightly, circled)*

A. *(handwritten)*

B.

(Graph with Income ($) on y-axis from 5 to 15, Number of papers on x-axis from 10 to 50; line starting at 10 and declining)

$y = .05x + 10.$ *(handwritten)*

☹ Slope negative. *(handwritten)*

C.

(Graph with Income ($) on y-axis from 5 to 50, Number of papers on x-axis from 5 to 25; steep rising line from 10)

↑ Slope too steep ☹ *(handwritten)*

D.

(Graph with Income ($) on y-axis from 5 to 50, Number of papers on x-axis from 5 to 25; even steeper rising line)

↑ slope even steeper ☹ *(handwritten)*

9). Determine the slope of the linear relation $3x + 5y + 15 = 0$.

A). $\dfrac{5}{3}$

B). $\dfrac{3}{5}$

C). $-\dfrac{3}{5}$

D). $-\dfrac{5}{3}$

(handwritten) **C**

$\dfrac{5y}{5} = \dfrac{-3x - 15}{5}$

$y = -\dfrac{3}{5}x - 3$

10). Which of the following coordinates are intercepts of the linear relation $2x - 3y + 30 = 0$?

(handwritten) **B**

A). I only

B). I and IV only

C). II and III only

D). II and IV only

(handwritten)
(Y is 0)
Xint
$2x + 30 = 0$
$2x = \dfrac{-30}{2}$
$x = -15$
$(-15, 0)$

(X is 0)
Yint
$-3y + 30 = 0$
$-3y = -30$
$\dfrac{-3y}{-3} = \dfrac{-30}{-3}$
$y = 10$
$(0, 10)$

I.	$(0, 10)$ ✓
II.	$\left(0, \dfrac{2}{3}\right)$
III.	$(-10, 0)$
IV.	$(-15, 0)$ ✓

11). Kelly explained her method for graphing the linear relation $y = -\dfrac{2}{3}x + 7$ as follows:

	Steps
I.	Place a dot on the y-axis at positive 7. ✓
II.	Move up two on the y-axis to positive 9.
III.	From the positive 9, move to the left three spots and place a dot there.
IV.	Draw a line through the two dots.

Where did Kelly make the first mistake, if any, in her explanation?

A). Step I
B). Step II
C). Step III
D). There is no mistake.

[handwritten: D]

12). Alex bought 144 bagels for $80. His profit was $75 once he had sold 100 bagels.
Which equation below represents Alex's profit P, as a function of the number sold, n ?

A). $P = -0.05n + 80$
B). $P = 0.05n - 80$
C). $P = 0.75n$
D). $P = 1.55n - 80$

[handwritten: D.]

[handwritten work:
 # bagels | $ P
0 | -80
100 | 75
(0, -80)
(100, 75)
$m = \dfrac{y_2 - y_1}{x_2 - x_1}$
$= \dfrac{75 + 80}{100 + 0} = \dfrac{155}{100}$
$m = 1.55$*]*

13). Determine the slope-intercept equation of the line that is parallel to $y = \dfrac{2}{5}x - 3$ and passes through the point $(0,5)$.

A). $y = -\dfrac{5}{2}x - 3$

B). $y = -\dfrac{5}{2}x + 5$

C). $y = \dfrac{2}{5}x + 3$

D). $y = \dfrac{2}{5}x + 5$

[handwritten: D]

[handwritten work:
$m = \dfrac{2}{5}$
$y - 5 = \dfrac{2}{5}(x - 0)$
$y - 5 = \dfrac{2}{5}x + 5$
$y = \dfrac{2}{5}x + 5$*]*

14). Lines A and B are perpendicular and have a same x-intercept. The equation of line A is $x + 2y - 4 = 0$. Determine the y-intercept of line B.

A). -8
B). -2
C). 4
D). 8

[handwritten: A]

[handwritten work:
x-in (y=0)
x - 4 = 0
x = 4
(4, 0)
$y - 0 = 2(x - 4)$
$y = 2x - 8$

$x + 2y - 4 = 0$
$x + 2y = 4$
$2y = -x + 4$
$y = -\dfrac{1}{2}x + 4$
$m_1 = 2$*]*

15). The cost to insure jewellery is a _fixed amount_ plus a percentage of the value of the jewelry.
- It costs $32 to insure $1000 worth of jewelry, or
- It costs $44.50 to insure $3500 worth of jewelry.

What is the fixed amount to insure jewelry?

A
- A). $27.00 ← *b* ∴ $ is *y*.
- B). $31.25
- C). $44.65
- D). $58.82

indep	dep.
x	y
1000	32
3500	44.50
0	?

$$m = \frac{44.50 - 32}{3500 - 1000}$$
$$= \frac{12.5}{2500} = \frac{125}{25000}$$
$$m = \frac{1}{200}$$

$$44.50 = \frac{1}{200}(3500) + b$$
$$44.50 = \frac{3500}{200} + b \Rightarrow \begin{array}{l} 44.50 = 17.5 + b \\ -17.50 \quad -17.5 \\ \$27.^{00} = b \end{array}$$

16).

a) Determine the slope of each line.

i) a line that passes through A(–4, 7) and B(6, 3)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow m = \frac{3-7}{6+4}$$
$$= \frac{-4}{10} = \boxed{\frac{-2}{5}}$$

ii) a line described by the equation $3x - 2y + 7 = 0$

$$\frac{-2y}{-2} = \frac{-5x - 7}{-2} \Rightarrow y = \frac{5}{2}x + 3\frac{1}{2} \qquad \boxed{m = \frac{5}{2}}$$

b) Are the lines in part **a)** parallel, perpendicular, or neither? Justify your answer.

parallel   (perpendicular)   neither

perpendicular — ① reciprical : $\frac{-2}{5} \times \frac{5}{2}$
② opposite : $\ominus \rightarrow \oplus$

17).

a) Write an equation for the line that passes through E(4, –3) and is parallel to the line $y + 1 = \frac{5}{7}(x - 4)$.

Write the equation in general form.

$$\boxed{5x - 7y - \quad = 0} \leftarrow$$

$$y + 3 = \frac{5}{7}(x - 4)$$
$$y + 3 = \frac{5}{7}x - \frac{20}{7} \qquad .^{5\cdot4x} \quad .^{20}7 \qquad \boxed{m}$$
$$-\frac{5}{7}x + y + \frac{21}{7} + \frac{20}{7} = 0$$
$$-7\left(-\frac{5}{7}x + y + \frac{41}{7} = 0\right)$$

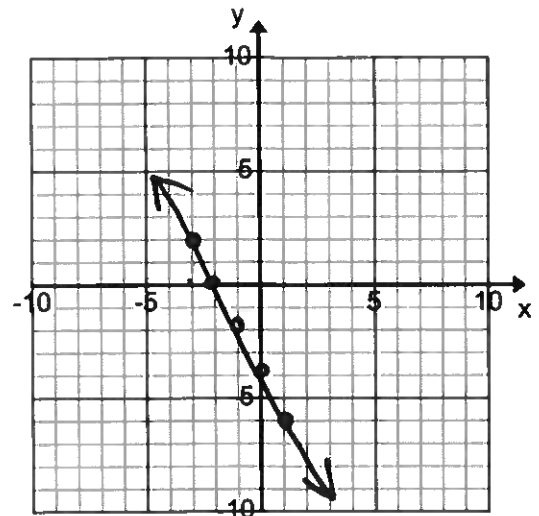**b)** Write an equation for a line with x-intercept –3 and y-intercept 5. Explain your strategy.

$$(-3, 0) \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$(0, 5) \quad = \frac{5-0}{0+3}$$
$$= \frac{5}{3}$$

$$y - 0 = \frac{5}{3}(x + 3)$$
① find slope
② use point-slope

18). Graph each equation. Describe the strategies you used.

a) $y - 2 = -2(x + 3)$
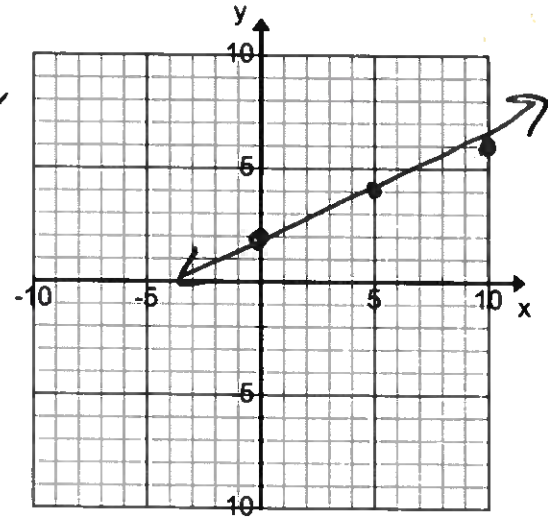
point is $(3, 2)$

$$m = -2$$

b) $2x - 5y + 10 = 0$ ← turn general form into a slope-intercept

$$\frac{-5y = -2x - 10}{-5 \qquad -5}$$
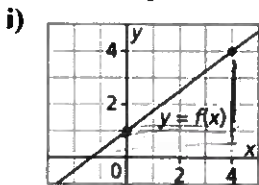
$$y = \frac{2}{5}x + 2$$

c) $y = -\frac{3}{5}x - 2$

↑ graph from this

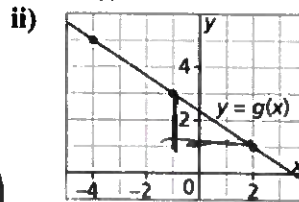$m = -\frac{3}{5}$

$b = -2$
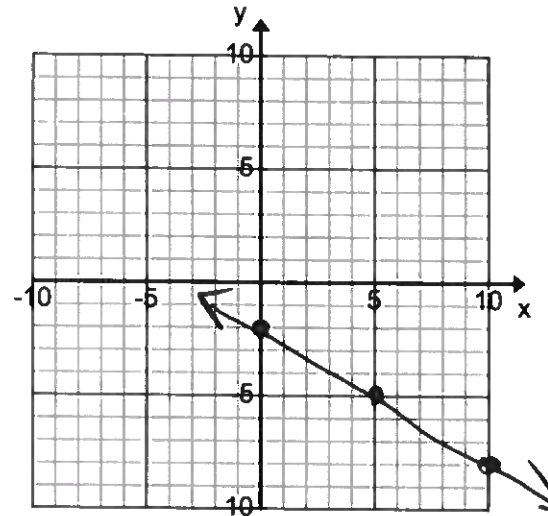
19).

a) Write an equation for each graph.   Describe or show your strategy.

i)

$b = 1$

$m = \frac{3}{4}$

$$\boxed{y = \frac{3}{4}x + 1}$$

① use slope-intercept

② $b = +1$

③ $m = 3/4$

ii)

$(-1, 3)$ ← point

$m = -\frac{2}{3}$

① use slope-point

$$y - 3 = -\frac{2}{3}(x + 1)$$

or $y - 5 = -\frac{2}{3}(x + 4)$

or $y - 1 = -\frac{2}{3}(x - 2)$

b) Write the above equation in part **a)** in general form.

$y = \frac{3}{4}x + 1$ (i)

$-\frac{3}{4}x - 1$

$-\frac{3}{4}x + y - 1 = 0$

$3x - 4y + 4 = 0$

b) Write the above equation in part **a)** in slope-point form or slope-intercept (whichever form is not shown in part **a)**.

$y - 3 = -\frac{2}{3}(x + 1)$ (ii)

$y - 3 = -\frac{2}{3}x - \frac{2}{3}$

$+\frac{2}{3}x + \frac{2}{3}$

$\frac{2}{3}x + y - \frac{9}{3} + \frac{2}{3} = 0$

$3\left(\frac{2}{3}x + y - \frac{7}{3} = 0\right)$

$2x + 3y - 7 = 0$

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c) Use a point on the line to verify each equation.

Use point $(0, 1)$

$3(0) - 4(1) + 4 = 0$

$0 - 4 + 4 = 0$

$0 = 0$ ✓ verified

c) Use a point on the line to verify each equation.

Use point $(2, 1)$

$2(2) + 3(1) - 7 = 0$

$4 + 3 - 7 = 0$

$0 = 0$ ✓ verified

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20). Josie started a part-time job when she was 16. She had opened a saving account a few years earlier and had already some money in the account. Each month, she put a <u>fixed amount</u> into her savings account. After 4 months, Josie had $770 in her savings account. After one year, she had $1450 in her savings account.

a) Write an equation to describe this relation. Write your equation in slope-intercept form.

months	$
4	770
12	1450

★ start in slope-point form

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{1450 - 770}{12 - 4}$

$= \frac{680}{8} = 85$

$y - 1450 = 85(x - 12)$

$y - 1450 = 85x - 1020$

$+ 1450 \qquad\qquad + 1450$

$y = 85x + 430$

b) How much money will Josie have after 2 years?

$y = 85(24) + 430$

$y = 2040 + 430$

$= 2470

c) How long will it be until Josie has $4000 in her savings account?

$$y = 85x + 430$$

$$4000 = 85x + 430$$

$$-430 \qquad -430$$

$$\frac{3570}{85} = \frac{85x}{85}$$

$$42\text{mths} = X$$
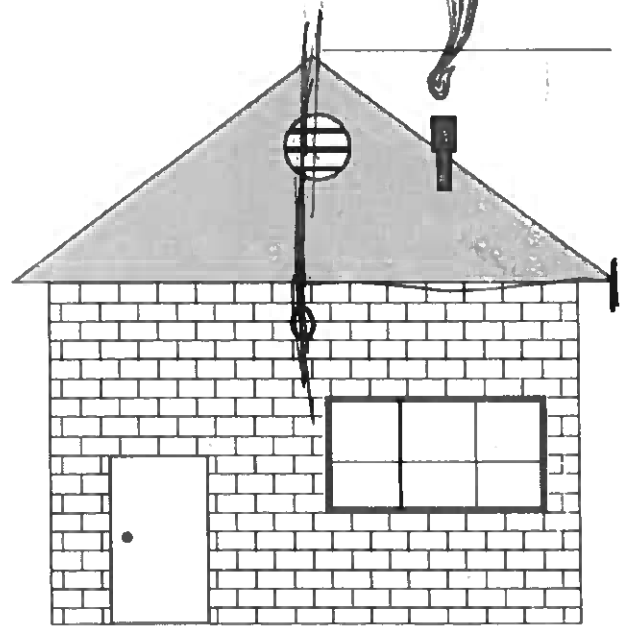
42 months = 3½ years

21). Use a ruler to determine the slope of the roof shown below. State the slope as both a fraction & as a decimal.

$$rise = 3cm$$
$$run = 4 cm$$

Slope as a fraction $\dfrac{3}{4}$

Slope as a decimal 0.75

Note: This diagram is drawn to scale.