Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ date: \_\_\_\_\_\_\_\_\_ period: \_\_\_\_\_\_

**COLLEGE PREP ~ CHAPTER 3 REVIEW**

**SECTION 3.1 - Linear Equations and Linear Functions**

You should know…..

* The “Standard Form” of a line. Ax+ By = C, where A,B, and C are real numbers.
* How to find intercepts: x-intercept (x, 0) – let y=0 and solve for x; y-intercept (0, y) – let x=0 and solve for y.
* The equation of a Vertical line: $x=a$, where $a$ is the x-intercept
* The equation of a Horizontal line: $y=b$, where $b$ is the y-intercept.
* What a linear function is. $f\left(x\right)=mx+b$, where *m* and *b* are real numbers. Its graph is a line.

***Graph each linear equation. Use whatever method you would like – plotting points, finding intercepts, or using the slope-intercept formula. Make sure that you label at least 3 points, you connect your points and extend the line past the points, and that you put arrows on the ends of your lines!***

**1.** $5x-2y=6$ **2.** $4x+3y=0$ **3.** $y=-\frac{1}{3}x+2$

  

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

 

**Section 3.2 – Slope and Equations of Lines**

You should know…..

* How to find the slope of the line by:
	+ - Looking at a graph and determining the rise and run between two points.
		- Using the slope formula: $m=\frac{y\_{2}-y\_{1}}{x\_{2}-x\_{1}} or m=\frac{Δy}{Δx}$
* …which direction a positive or negative slope leans
* … that a horizontal line has a slope of 0 (zero).
* … that a vertical line has an undefined slope.
* … that slope is a constant rate of change.
* The Point-Slope form of a line: $y-y\_{1}=m\left(x-x\_{1}\right)$, and when to use it (to find the equation of a line given the slope and one point, or given two points).
* The Slope-Intercept form of a line: $y=mx+b$, and when to use it (when given an intercept and a slope).

***Find the slope of the line between the two points listed. Use any method.***

**6.** (-1, 5) and (2, -1) **7.** (4, 5) and (-2, 5) **8.** (-1, 3) and (-1, -4)

***Find the slope and the y-intercept of each line.***

**9.** $y=4x-6$ **10.** $2x+3y=12$ **11.** $y=-5$

***Find the equation of the line with the given slope and containing the given point. Express your answer in slope-intercept form.***

**12.** $m=-1; \left(3, 2\right)$ **13.** $m=\frac{3}{5}; \left(-10, -4\right)$

***Find the equation of the line containing the given points. Express your answer in slope-intercept form.***

**14.** (6,2) and (-3, 5) **15.** (-2, 3) (4, 3) **16.** (-1, 2) (8, -1)

**Section 3.3 – Parallel and Perpendicular Lines**

You should know…

* *Parallel lines* have the same slope and different y-intercepts.
* *Perpendicular lines* have slopes that are negative reciprocals (the product of the slopes equals -1).
* Horizontal and vertical lines are always perpendicular to each other.
* …how to find the equations of perpendicular and parallel lines.

***In problems 17 and 18, assume that that slope of line* L *is*** $m=-\frac{3}{8}$***.***

**17.** Determine the slope of the line that is **18.** Determine the slope of the line that is

 *parallel* to line L. *perpendicular* to line L.

***Determine whether the given pairs of linear equations are parallel, perpendicular, or neither.***

**19.** $x-3y=9$ **20**. $6x-8y=16$ **21.** $2x-y=3$

 $9x+3y=-3$ $3x+4y=28$ $-6x+3y=0$

***Find an equation of the line with the given properties. Express your answer in slope-intercept form.***

**22.** Parallel to $y=-2x-5$ through (1,2) **23.** Perpendicular to $3x+4y=6$ through (-3, -2)

**24.** Parallel to $5x-2y=8$ through (4,3) **25**. Perpendicular to $y=-3$ through (5, -3)

**26.** Parallel to $x=-4$ through (1, 5)

**Section 3.4 – Linear Inequalities in Two Variables**

You should know…

* How to determine if an ordered pair is a solution to a linear inequality. (Plug it in and see if it’s “true”.)
* Graph linear inequalities – including knowing when to make the line dashed ( < or >) or solid ($\leq or \geq $), and how to use a test point to determine which half-plane to shade.
* Solve problems using linear inequalities.

***Determine whether the given points are solutions to the linear inequality.***

**27.** $x-2y>-4$

 A) (2, 3) B) (5, -2) C) (-1, 3)

***In problems 28-30, graph each inequality.***

**28.** $y<3x-2$ **29.** $2x-4y\leq 12$ **30.** $3x+4y>20$

  

**Section 3.5 – Building Linear Models**

You should know…

* How to build a linear model from a verbal description (write a function, and make predictions using it.)
* What direct variation is ($y=kx$, where k is the constant of proportionality (or slope)).
* How to build models (write function equations) that involve direct variation, like depreciation or cost models.
* How to build models from a set of data – make a scatter plot (diagram), write a line of best fit between two points, and make predictions.

**31.** Joan plans to sell small wooden shelves at a crafts fair for $30 each. A booth at the fair costs $100 to rent. Joan estimates that her expenses for producing the shelves to be $12 a shelf.

 A) Write a function that expresses Joan’s profit ***P*** as a function of the number of shelves ***x*** sold.

 B) Find the profit is Joan sells 34 shelves?

 C) If Joan’s profit is $764, how many shelves did she sell?

**32.** The table below lists the average weight of a Shetland pony, depending on the age of the pony.



|  |  |
| --- | --- |
| Age inmonths (x) | Average weight inkilograms (y) |
| 3 | 60 |
| 6 | 95 |
| 12 | 140 |
| 18 | 170 |
| 24 | 185 |

 A) Draw a scatter plot of the data.

 Which variable is the independent

 variable? Put that on your x-axis.

 Label your axes!

 B) Does the function appear to be linear? Yes or No

 C) Find the equation of the line between the points (6, 95) and (18, 170). Draw the line on the graph above.

 D) Predict the weight of a 9 month old Shetland pony.

 E) Predict the weight of a 22 month old Shetland pony.

**CUMULATIVE REVIEW QUESTIONS: *You will see any or all of these types of questions on the test. They will not be in a section of their own, but will be scattered throughout the test. These make up a considerable portion of the test, so make sure you study them!***

**33.** Solve the following inequality. Write your answer in interval notation (with brackets or parentheses):

 $5\left(x-3\right)\geq 7x-25$

**34.** Identify the domain and range of the following set. Is this relation a function?

 {(-1, 3), (0, 4), (-1, 6), (1, -2), (2, -5)}

 Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Function? Yes or No

**35.** Evaluate: $50+200÷25∙\left(-2\right)^{2}$

**36.** For $f\left(x\right)=5x-4$ find $f\left(x+y\right)$

**37.** Determine the domain of $y=\frac{3x+2}{x-4}$

**38.** Determine if (7,-5) is a point on the graph of $y=3x+22$

**39.** Solve the equation: $8\left(n-2\right)-7=6n-5$

**40.** Evaluate $x^{3}+3x^{2}-5x-7 for x=-3$

**COLLEGE PREP CHAPTER 3 REVIEW KEY**

**1.** 111111111 **2.** **3.** **4.** **5.**











**6.** $m=-2$ **7.** $m=0$ **8.** $m$ is undefined. **9.** $m=4, b=-6$ **10.** $m=-\frac{2}{3}, b=4$

**11.** $m is undefined, b=-5$ **12.** $y=-x+5$ **13.** $y=\frac{3}{5}x+2$ **14.** $y=-\frac{1}{3}x+4$

**15.** $y=3$ **16.** $y=-\frac{1}{3}x+\frac{5}{3}$ **17.** $m=-\frac{3}{8}$ **18.** $m=\frac{8}{3}$ **19.** Perpendicular

**20.** Neither. **21.** Parallel. **22**. $y=-2x+4$ **23.** $y=\frac{4}{3}x+2$ **24.** $y=\frac{5}{2}x-7$ **25.** $x=5$

**26**. $x=1$ **27.** (a) No (b) yes (c) no **28**. **29.** **30.**

Dashed line



Dashed line



Solid line



**31.** (a) $P\left(x\right)=18x-100$

 (b) $\$512$ (c) 48 shelves

**32**. (a) Scatter plot not shown

 (b) yes (c) $y=6.25x+57.5$

 (d) 113.75 kg (e) 195 kg

**33.** $x\leq 5$ **34.** Domain: {-1, 0, 1, 2} Range: {3, 4, 6, -2, -5} Not a function. **35.** 82

**36.** $f\left(x+y\right)=5x+5y-4$ **37.** $\left\{x\ne 4\right\} or \left(-\infty ,4\right)∪\left(4, \infty \right)$ **38.** Yes **39.** $n=9$ **40.** 8

**COLLEGE PREP CHAPTER 3 REVIEW KEY**

**1.** 111111111 **2.** **3.** **4.** **5.**











**6.** $m=-2$ **7.** $m=0$ **8.** $m$ is undefined. **9.** $m=4, b=-6$ **10.** $m=-\frac{2}{3}, b=4$

**11.** $m is undefined, b=-5$ **12.** $y=-x+5$ **13.** $y=\frac{3}{5}x+2$ **14.** $y=-\frac{1}{3}x+4$

**15.** $y=3$ **16.** $y=-\frac{1}{3}x+\frac{5}{3}$ **17.** $m=-\frac{3}{8}$ **18.** $m=\frac{8}{3}$ **19.** Perpendicular

**20.** Neither. **21.** Parallel. **22**. $y=-2x+4$ **23.** $y=\frac{4}{3}x+2$ **24.** $y=\frac{5}{2}x-7$ **25.** $x=5$

**26**. $x=1$ **27.** (a) No (b) yes (c) no **28**. **29.** **30.**

Dashed line



Dashed line



Solid line



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