Exam 2 — Algebra

Use proper notation and show your work. Name Key

1. Evaluate each expression for the given value(s) of the variable(s).

(a) $4x^2 - 3x - 7$, $x = -2$

$4(-2)^2 - 3(-2) - 7$

$= 4(4) + 6 - 7$

$= 16 + 6 - 7$

$= 15$

(b) $3x^2 - 5xy + 4$, $x = 2$, $y = 5$

$3(2)^2 - 5(2)(5) + 4$

$= 3(4) - 50 + 4$

$= 12 - 50 + 4$

$= -34$

2. Combine like terms.

(a) $5a - 7 + 7a + 4 - 9a$

$= 3a - 3$

(b) $8(w + 4) - 3(2w - 6) - 7$

$= 8w + 32 - 6w + 18 - 7$

$= 2w + 43$

3. Solve each equation or formula.

(a) $7d - 4 = 9$

$7d = 13$

$d = \frac{13}{7} = 1\frac{6}{7}$

(b) $\frac{2z+3}{6} = \frac{5z-7}{4}$

$\frac{12}{1} \cdot \frac{2z+3}{6} = \frac{12}{1} \cdot \frac{5z-7}{4}$

$4z + 6 = 15z - 21$

$27 = 11z$

$\frac{27}{11} = z$

$z = 2\frac{5}{11}$

(c) $3(5t+4) = 9t - 8$

$15t + 12 = 9t - 8$

$6t = -20$

$t = -\frac{20}{6} = -\frac{10}{3}$

$t = -3\frac{1}{3}$

(d) $S = 4lw + 2wh$; determine l when $S = 60$, $h = 5$, and $w = 2$.

$60 = 4l(2) + 2(2)(5)$

$60 = 8l + 20$

$40 = 8l$

$5 = l$

(e) $9x + 5y = 13$; solve for y

$5y = 13 - 9x$

$y = \frac{13 - 9x}{5}$

$y = \frac{13}{5} - \frac{9}{5}x$

(f) $L = \frac{c+2d}{4}$; solve for d

$4L = c + 2d$

$4L - c = 2d$

$\frac{4L - c}{2} = d$

4. Write the solution set for each inequality in set-builder notation and graph the solution on a number line.

(a) $2 - 3x > 14$

$-3x > 12$

$x < -4$

$\{x \mid x < -4\}$

(b) $-4 \leq \frac{x-5}{3} < 2$

$-12 \leq x - 5 < 6$

$-7 \leq x < 11$

$\{x \mid -7 \leq x < 11\}$

5. Write each phrase as a mathematical expression.

(a) Eight less than twice a number

$2x - 8$

(b) The triple the sum of a number and six

$3(x+6)$

6. Determine the slope of the line through the given points. If the slope is undefined, so state.

(a) (–2, 7) and (–5, 9)

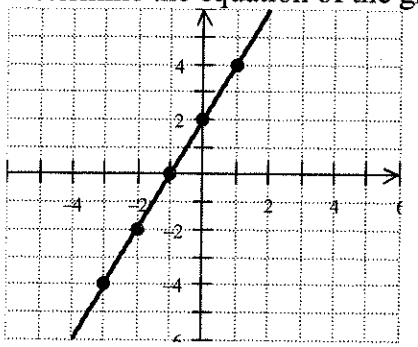
$\frac{9-7}{-5-(-2)} = \frac{2}{-3}$

(b) (4, –3) and (4, 6)

$\frac{6-(-3)}{4-4} = \frac{9}{0}$

undefined

7. Determine the equation of the graph.

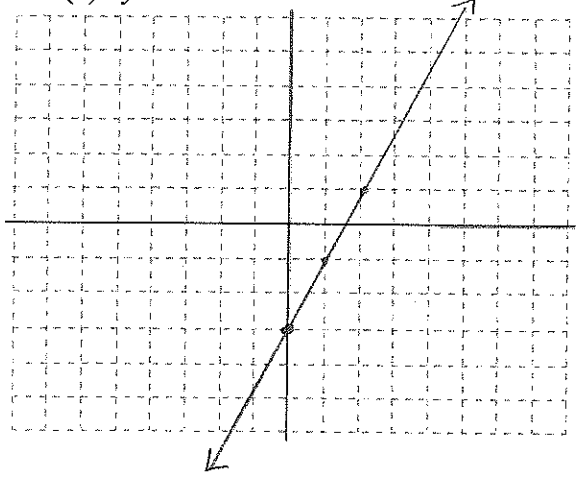


$m = \frac{2}{1} = 2 \quad (0, 2)$

$y = 2x + 2$

8. Graph each problem.

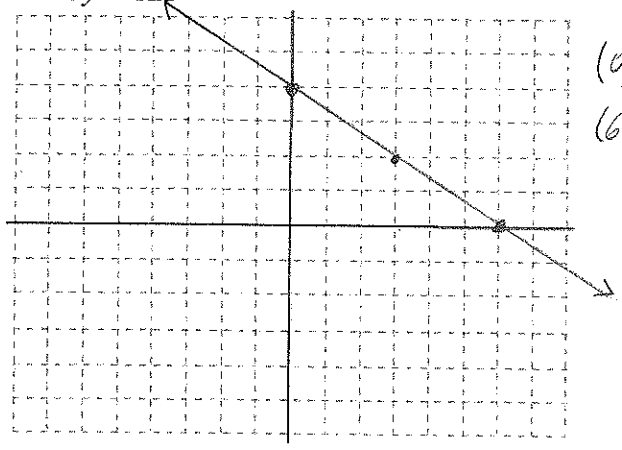
(a) $y = 2x - 3$



(b) $2x + 3y = 12$

$3y = -2x + 12$

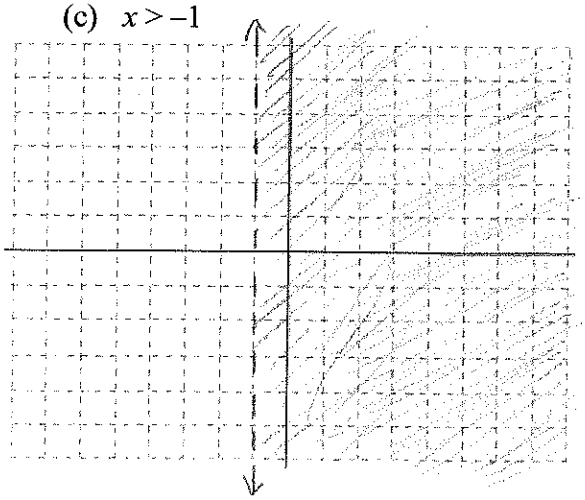
$y = -\frac{2}{3}x + 4$



(0, 4)

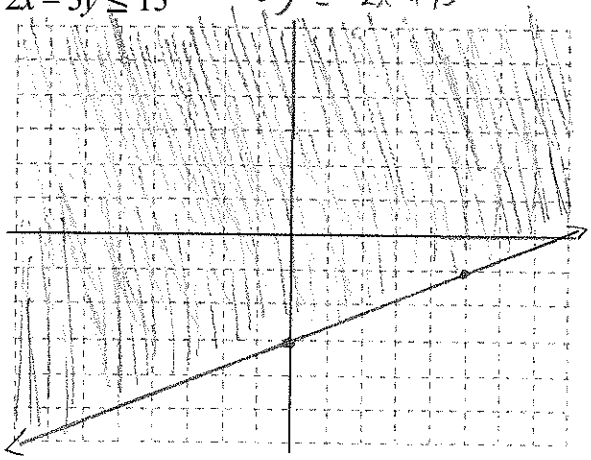
(6, 0)

(c) $x > -1$



(d) $2x - 5y \leq 15$

$-5y \leq -2x + 15$



$y \geq \frac{2}{5}x - 3$

9. Set up an equation and solve each problem.

(a) Five more than four times a number is the difference between the number and eight.

$4x+5 = x-8$

$3x = -13$

$x = -\frac{13}{3}$

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

The number is $-4\frac{1}{3}$.

(b) A sheet metal worker earns \$27.17 per hour after receiving a 4.5% raise. What was the sheet metal worker's hourly pay before the raise?

Let x represent the hourly pay before the raise

$x + 0.045x = 27.17$

$1.045x = 27.17$

$x = \frac{27.17}{1.045}$

$x = 26$

$1.045\overline{)27.170}$ $\quad 26.$

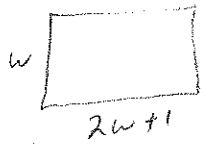
2090

6270

-6270

The worker's hourly pay before the raise was \$26.

(c) The length of a rectangle is one foot more than twice the width. The perimeter is twenty feet. Find the dimensions.



$2(2w+1) + 2w = 20$

$4w + 2 + 2w = 20$

$6w + 2 = 20$

$6w = 18$

$w = 3$

$2w+1 = 2(3)+1 = 7$

The dimensions are 3 feet by 7 feet.

(d) The property tax on a home varies directly to the assessed value of the home. If the property tax on a home with an assessed value of \$140,000 is \$2,100, what is the property tax on a home with an assessed value of \$180,000?

$T = kV$

$2100 = k(140000)$

$k = \frac{2100}{140000} = \frac{3}{200}$

$T = \frac{3}{200} \cdot \frac{180000}{1} = 2700$

The tax is \$2,700 on a \$180,000 property.