

Math 0302 Course Review

Solve the following:

- | | |
|-------------------------------------------------|------------------------------------------------------------------|
| 1) $-4y + 23 = 47$ | 2) $-6(2y + 3) - 4 = -12y - 22$ |
| 3) $\frac{5y+1}{6} - \frac{2y-4}{3} = 2$ | 4) $\frac{2x+6}{7} = \frac{3x-1}{x}$ |
| 5) $x = \frac{1}{7}y + pg$ (solve for y) | 6) $x^2 - 7x + 6 = 0$ |
| 7) $ac - bc = ab + vh$ (solve for a) | 8) $x^2 = 81x$ |
| 9) $(x - 4)(x + 7) = 11x + 5$ | 10) $x^2(6x - 5) = 6x$ |
| 11) $10x^2(x - 2) - 19x(x - 2) - 15(x - 2) = 0$ | |
| 12) $3x^3 - 24x^2 = 27x$ | 13) $\frac{1}{a} = \frac{1}{f} - \frac{1}{h}$, solve for f |
| 14) $S = \frac{a-5b}{6b}$ for b | 15) $\frac{5}{6}d + \frac{5}{12} = \frac{1}{3} - \frac{3}{4}$ |
| 16) $\frac{x}{-6.9} = \frac{0.3}{23}$ | 17) $\frac{\frac{4}{11}}{\frac{7}{9}} = \frac{x}{-\frac{66}{5}}$ |

Simplify. Write your answer without negative exponents:

- | | |
|----------------------------------------------------------------------------------------|---------------------------------------------|
| 18) $3x^2 - \frac{2}{11} + \frac{8}{7}x + \frac{7}{3} - \frac{9}{7}x + \frac{5}{3}x^2$ | 19) $8(-6b + 11) - 6(b - 3)$ |
| 20) $9(3x + 7) - (89x - 4) - 4x + 8$ | 21) $\frac{-132x^5z^8}{77x^2z}$ |
| 22) The product of twice $\frac{3}{8}$ and $\frac{16}{7}$. | 23) $-5^2 \cdot (-5x)^2$ |
| 24) $-7x^5y^{11}(4x^2y^5 - 8xy)$ | 25) $-6c^3(-5b^2 + 6c - 9)$ |
| 26) $-(0.45 - 0.32)^2 - 0.24 \div 0.6(0.4)$ | 27) $(8x - 5)(6x^2 + 4x - 11)$ |
| 28) $-7x^{-3}$ | 29) $(-7x)^{-3}$ |
| 30) $\frac{5}{y^{-3}}$ | 31) $\frac{-7^2x^{-5}y^7}{(-5)^2a^4b^{-3}}$ |

Simplify the following:

- 32) $(7x^2 - 11xy + 4y^2) - (2x^2 - 3xy - 5y^3)$ 33) $(\frac{8}{3}x - \frac{7}{2}y)^2$
- 34) $9x^3y^2(5x^2 - 6y + 3x - 4y^4)$ 35) $(4x - 3y)(4x + 3y)$
- 36) $0.8x^2 + 0.07x - (-0.9x^2 + 0.11x - 3)$ 37) $(x - 2)(3x + 5)^2$
- 38) $8(a^2 - 4a + 3b) - 7(b^2 - 8a + 5b)$ 39) $(x^2 - 8x - 5)(x^2 + 7x + 1)$
- 40) $(ab^4)^5 (-2a^3b^2)^4 (-a^5b)^5$ 41) $\frac{(-2x^3y)^3 x^0 z^3 w^8 y^3}{(-3xy)^4 y^2}$

Set - up the equation and solve the following:

- 42) Oscar the Grouch had to take a 15% pay cut since the Federal Government is cutting back on its financial support of PBS. If his new salary is \$12.75 per hour, what was his salary before the pay cut?
- 43) Use the formula $F = \frac{9}{5}C + 32^\circ$. to find what 48.2° F is equal to in Celsius.
- 44) Juan paid \$650 in taxes. If this is 26% of his total salary, what was his total salary?

Find the equation of the line satisfying the following conditions:

- 45) Passes through the points $(-2, 5)$ and $(7, 5)$.
- 46) Passes through the points $(9, -2)$ and $(6, 4)$.
- 47) Passes through the points $(-4, -7)$ and $(4, 3)$.
- 48) Passes through the points $(-1, -6)$ and $(-4, 2)$.
- 49) The line passes through $(-5, -2)$ and is parallel to $5y - 3x = 2$.
- 50) The line passes through $(2, -7)$ and is perpendicular to $7x + 3y = 1$.
- 51) The line passes through $(-0.5, 2)$ and is parallel to $x = 3$.
- 52) The line passes through $(4, -11)$ and is perpendicular to $x = 3$.

Find the slope and y-intercept (if possible) and graph the following:

53) $3y = -x - 6$

54) $\frac{1}{2}y - x = -4$

55) $3x = 4 + 2x$

56) $0.3x - 0.5y = -0.75$

Find the x-intercept and the y-intercept (if possible) and graph the following:

57) $3x + 4y = 12$

58) $y = 5$

59) $-4x - 6y = 3$

60) $-\frac{3}{5}x + \frac{2}{3}y = 1$

Convert the following:

61a) Write $-67,500$ into scientific notation.61b) Write 0.00452 in scientific notation.62a) Write -3.24×10^{-5} in standard notation.62b) Write 8.14×10^6 in standard notation.

Simplify the following, leaving your answers in scientific notation:

63) $\frac{4.3 \times 10^{75}}{8.6 \times 10^{-24}}$

64) $\frac{(9 \times 10^{37})(8 \times 10^{-23})}{-6 \times 10^{-55}}$

Consider the following expression: $8x^2z - 4px + 7x - 21$.

65a) What is the numerical coefficient of the second term?

65b) List the variable terms and the constant terms.

Factor the following completely:

66) $52x^3 - 13x^2y$

67) $5x^2 - 80y^2$

68) $x^2 - 9x + 18$

69) $14a^5b^3 + 21a^4b^4$

70) $x^2 + 16$

71) $x^3(y - a) + 64(y - a)$

72) $16x^2 - 64$

73) $x^2 - 9xy - 10y^2$

74) $27x^3y^3 - 8y^3 + 27x^3z^3 - 8z^3$

75) $x^4 - 7x^2 - 144$

Factor the following completely:

76) $\frac{121}{7}x^2 - \frac{66}{7}xy + \frac{9}{7}y^2$

77) $12x^3 + 12x^2 + 300x$

78) $(x - 3y)^2 - (2x + y)^2$

78) $35x^3y^2 - 7x^2y^2 + 14x^2y^3$

80) $a^2x^2 - 5a^2x + 4a^2 + b^2x^2 - 5b^2x + 4b^2$

81) $3x^2 + 192$

82) $12x^2 + 21xz - 20x - 35z$

83) $9x^3y + 54x^2y^2 + 81xy^2$

84) $x^2(y - z) - 8x(y - z) - 9(y - z)$

Simplify:

85) $\frac{-32x^{15}(y^4)^2z^2}{24x^{12}y^7z^8x^3}$

86) $(18x^2y - 36xy^2 + 24x^2y^2) \div (6xy)$

87) $\frac{11x^2 - 22x^3 + 33x}{11x^2}$

88) $\frac{42a^8b^6 - 56a^7b^7 + 28a^6b^8}{14a^7b^7}$

89) $(12x^2 - 7x - 15) \div (3x - 4)$

90) $(x^3 - 11x^2 + 8x + 37) \div (x + 3)$

91) $\frac{8x^3 - 22x^2 + 27x - 18}{2x - 3}$

If m and n are positive integers where m > n, use critical thinking to determine which answers are always true, sometimes true, or never true:

- 92) a) $(x^m y)^n = x^{mn} y^n$
 b) $(x - y)^m = x^m - y^m$ for all x and y.
 c) $x^m \div x^n = x$ for all $x \neq 0$.
 d) $\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}$ if $y \neq 0$.
 e) $(5 + n)^m = 5^m + n^m$.

Set up the equation and solve:

- 93) A diamond pendant was worth for \$1000. It's value increases by 20% of its original worth every decade. Write an equation for the value of the pendant and sketch the graph using the horizontal axis for decades and the vertical axis for the pendant's value.

Set up the equation and solve:

- 94) An airplane descends 2112 ft over a horizontal distance of 3 miles. What is its rate of descent? (Hint, 5280 ft = 1 mile).
- 95) A ball is thrown from the top of a cliff with an upward velocity of 64 feet per second. How many seconds after the ball is thrown will it hit the ground if the ground is 80 feet below the cliff. Use the formula $h = vt - 16t^2$ where h is the height, v is the velocity, and t is the time. (hint: the height is negative when the ball hits the ground).
- 96) The area of a triangle is 70 square inches. If the base is six inches less than twice the height of the triangle, find the length of the base and height of the triangle.
- 97) One leg of a right triangle is six centimeters more than twice the other. The hypotenuse is six centimeters less than three times the length of the shorter leg. Find the lengths of the sides of the triangle.
- 98) If the dimensions of a square are tripled, the area of the square increases by 200 square inches. Find the original dimensions of the square.
- 99) Two pipes can fill a tank in 3.75 hours. If it takes the smaller pipe four more hours to fill the tank working alone than the larger pipe, how many hours does it take each pipe to fill the tank working alone?

Find the domain of the following. Write your answer in interval notation:

100)
$$\frac{3x^2 + 48}{x^3 + 3x^2 - 4x - 12}$$

101)
$$\frac{2x+5}{6x^4 + 13x^3 - 15x^2}$$

102)
$$\frac{x^2 - 25}{2x^2 - 31x + 99}$$

103)
$$\frac{5x-10}{50x^2 + 32}$$

Simplify:

104) $\frac{x^2+3x}{x^3+3x^2+4x+12}$

105) $\frac{x^2+3x-4}{x^4-17x^2+16}$

106) $\frac{9x^2-1}{2x^2-13x+15} \cdot \frac{4x^2-12x+9}{3x^2-16x+5}$

107) $\frac{3x^2-5x-12}{x^3+64} \div \frac{9x^2+6x-8}{x^2-4x+16}$

108) $\frac{25x^2}{25x^2-30x+9} - \frac{9}{25x^2-30x+9}$

109) $\frac{3}{10x^2+21x+9} + \frac{5}{2x^2+21x+27}$

110) $\frac{\frac{7}{x+4} + \frac{13}{x-4}}{\frac{8}{x^2-16}}$

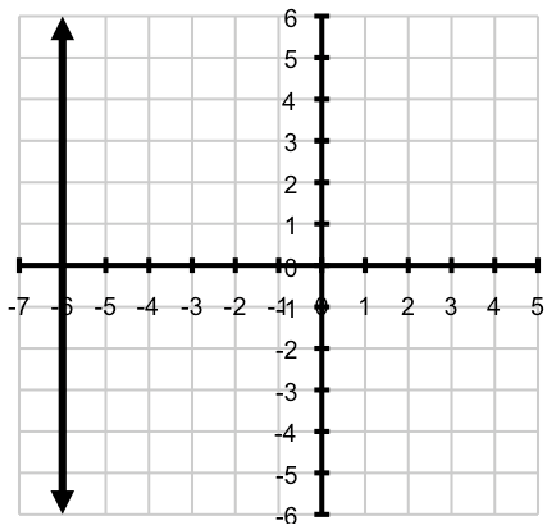
111) $\frac{5}{2} - \frac{1}{p-4} - \frac{-2}{2p-8}$

112) $\frac{22}{2x^2-9x-5} - \frac{3}{2x+1} - \frac{2}{x-5}$

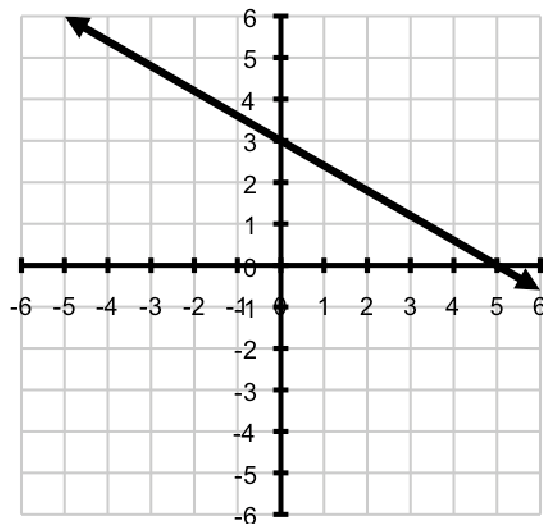
113) $\frac{1}{x+4} - \frac{3}{x^2-2x} + \frac{6}{x^2+2x-8}$

Given the graph, find the intercepts (if possible) and write the equation of the line:

114)

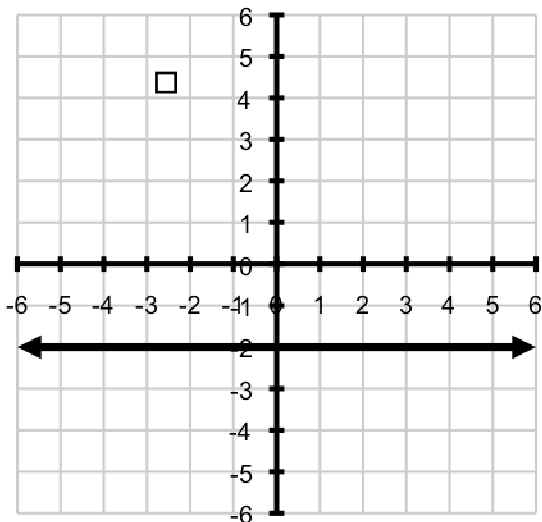


115)

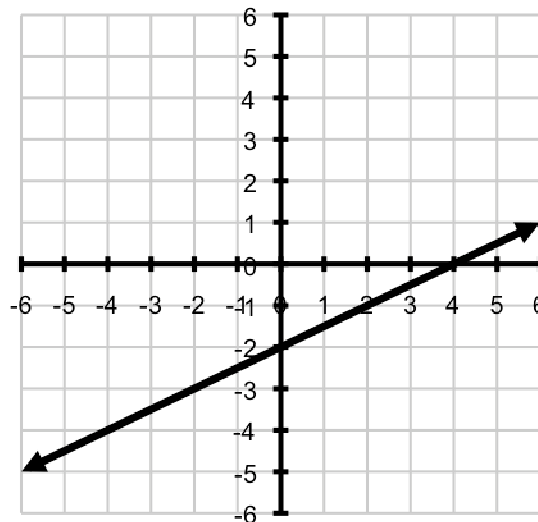


Given the graph, find the intercepts (if possible) and write the equation of the line:

116)

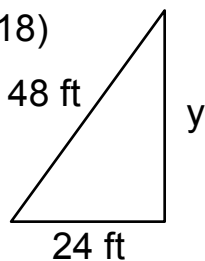


117)

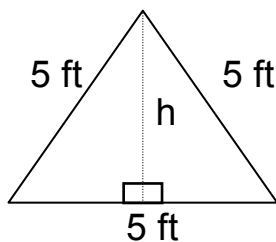


Find the indicated lengths of the following:

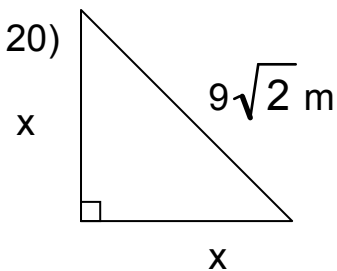
118)



119)



120)



Solve:

121)
$$\frac{1}{9} + \frac{1}{6x+5} = 2$$

122)
$$\frac{x-5}{x+1} = \frac{3}{5}$$

123)
$$\frac{1}{x+4} - \frac{3}{x^2-2x} = \frac{-6}{x^2+2x-8}$$

124)
$$\frac{5}{2} - \frac{1}{p-4} = \frac{-2}{2p-8}$$

125)
$$\frac{22}{2x^2-9x-5} - \frac{3}{2x+1} = \frac{2}{x-5}$$

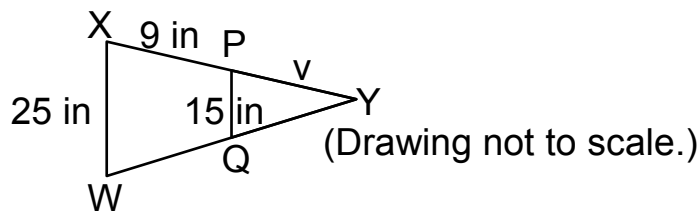
126)
$$\frac{3x}{x-1} = \frac{2}{x-2} - \frac{2}{x^2-3x+2}$$

Set up the equation(s) and solve:

- 118) Find the diagonal of a square if each side is 15 inches long.
- 119) The red army is five miles south and six miles west of Warrington while the blue army is one mile north and eight miles east of Warrington.
- How far apart are the two armies?
 - If the two armies marching toward each other at the same rate, where will they meet relative to Warrington?
- 120) A baseball diamond is a square with each side equal to 90 feet. How far does Mike Piazza have to throw a baseball from ten feet behind home base to second to catch a runner trying to advance on a wild pitch?

**Solve the following:**

- 121) Given $\triangle ABC \sim \triangle DEF$, $BC = 17$ cm, $EF = 28$ cm, $DF = 8$ cm, $m\angle D = 75^\circ$, & $m\angle E = 55^\circ$, find $m\angle C$ and AC .
- 122) Given $\triangle ABC \cong \triangle DEF$, $AB = 16$ m, $DF = 20$ m, $m\angle D = 41.4^\circ$, and $m\angle B = 90^\circ$, find AC , BC , DE , and the measure of $\angle C$?
- 123) If a tree casts 13.5 foot shadow at the same time that a five-foot person casts 1.8 foot shadow, how tall is the tree?
- 124) On $\triangle WXY$, there is a point P on \overline{XY} and a point Q on \overline{WY} such that $\overline{PQ} \parallel \overline{XW}$. If $XP = 9$ in, $PQ = 15$ in, and $XW = 25$ in, find PY (hint, let $v = PY$, then $v + 9 = XY$).



Set up the equation and solve:

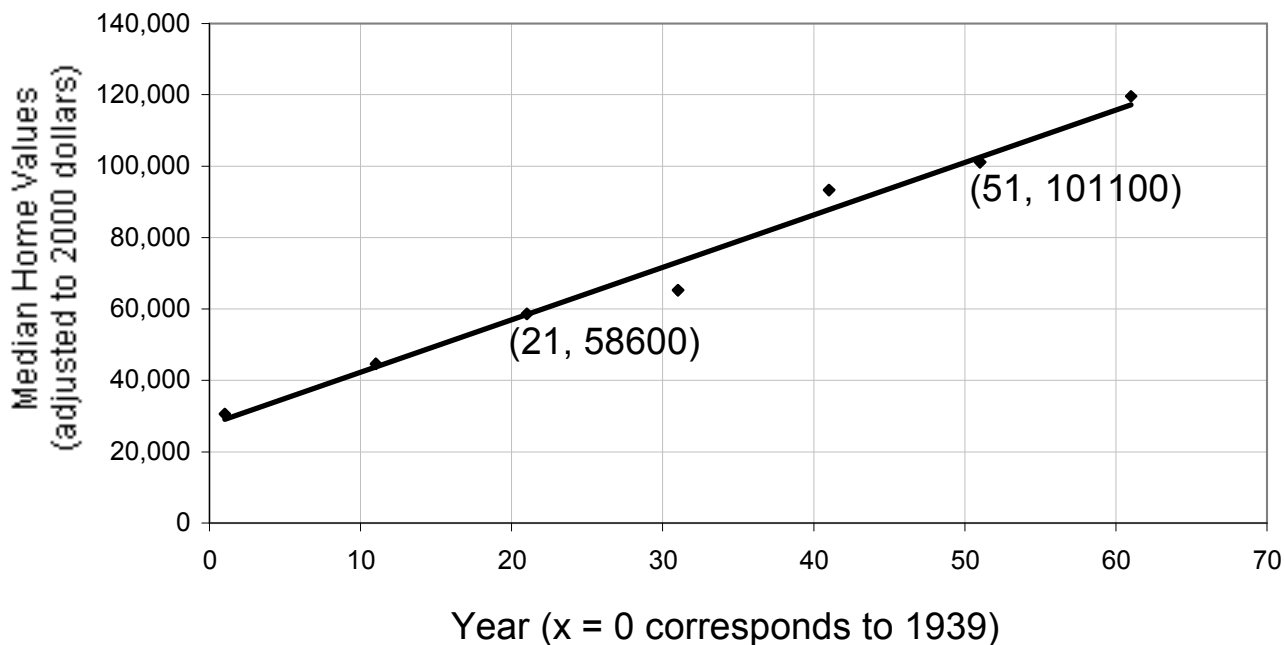
- 125) One printer can print 9000 copies of a manuscript in 18 hours. A second printer do the same job in 14 hours, Working together, how long will it take the two printers to complete the job?
- 126) Leroy drove 324 miles in the same amount of time as Juanita drove 378 miles. If Juanita was driving 12 miles per hour faster than Leroy, how fast were they driving?
- 127) Maria took a canoeing trip, traveling 30 miles upstream against a 2 mph current and then returning to the same point downstream. If the total trip took 8 hours, how fast can she paddle in still water?
- 128) Larry and Cindy can rebuild a car engine in 12 hours working together. If Larry takes 10 hours longer to the rebuild the engine working alone than Cindy, how would it take each of them to rebuild the engine working alone?
- 129) In a recent small town election, Evelyn Merriweather received 6241 votes out of 10,468 total votes to become the new mayor. If $\frac{4}{7}$ of the women and $\frac{5}{8}$ of the men voted for her, how many men and how many women voted?

Find the equation (in slope intercept-form if possible) of the line passing through the given points:

- 130) $(-4, 6)$ and $(1, 16)$ 131) $(5, 6)$ and $(8, 2)$
- 132) $(3.2, -4)$ and $(3.2, 9.1)$

- 133) The graph below shows median home value, y , every ten years beginning in 1940. All values have been adjusted for inflation and are measured in 2000 dollars. In other words, the values are measured in what a dollar was worth in the year 2000.
(Source: www.census.gov).

Median Home Values

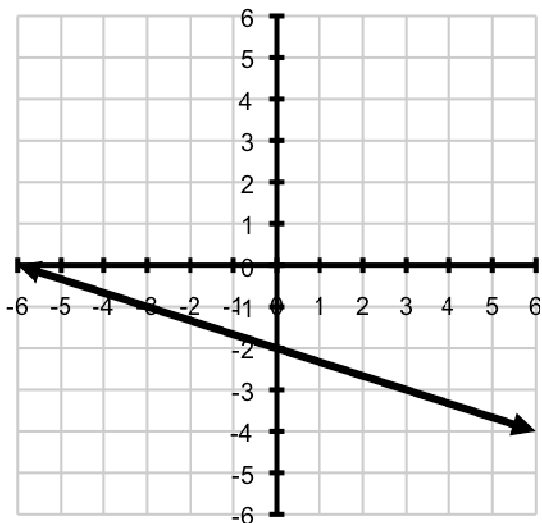


- Find the slope of the line.
- Find a linear equation for the line.
- Predict the median home value (in 2000 dollars) in the year 2010 (to the nearest hundred).

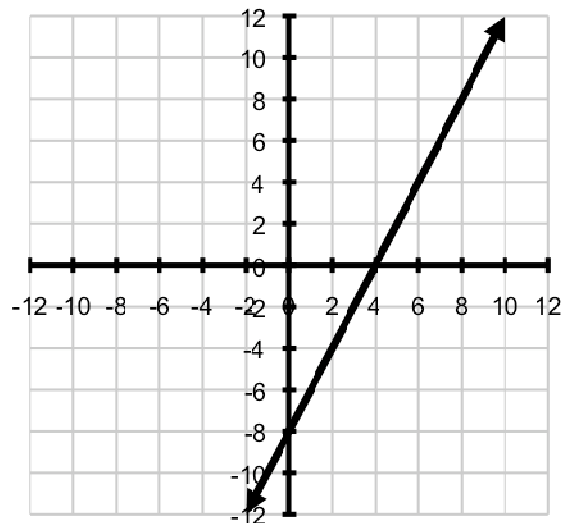
Answers:

- 1) $y = -6$ 2) All Real Numbers 3) $y = 3$ 4) $\{0.5, 7\}$ 5) $y = 7x - 7pg$
6) $\{1, 6\}$ 7) $a = \frac{vh+bc}{c-b}$ 8) $\{0, 81\}$ 9) $\{-3, 11\}$
10) $\{-\frac{2}{3}, 0, \frac{3}{2}\}$ 11) $\{-\frac{3}{5}, 2, \frac{5}{2}\}$ 12) $\{-1, 0, 9\}$ 13) $f = \frac{ah}{a+h}$
14) $b = \frac{a}{6S+5}$ 15) $d = -1$ 16) $x = -0.09$ 17) $-\frac{216}{35}$
18) $\frac{14}{3}x^2 - \frac{1}{7}x + \frac{71}{33}$ 19) $-54b + 106$ 20) $-66x + 75$ 21) $-\frac{12}{7}x^3z^7$
22) $\frac{12}{7}$ 23) $-625x^2$ 24) $-28x^7y^{16} + 56x^6y^{12}$ 25) $30b^2c^3 - 36c^4 + 54c^3$
26) -0.1769 27) $48x^3 + 2x^2 - 108x + 55$ 28) $-\frac{7}{x^3}$ 29) $-\frac{1}{343x^3}$
30) $5y^3$ 31) $-\frac{49b^3y^7}{25a^4x^5}$ 32) $5x^2 - 8xy + 4y^2 + 5y^3$
33) $\frac{64}{9}x^2 - \frac{56}{3}xy + \frac{49}{4}y^2$ 34) $45x^5y^2 - 54x^3y^3 + 27x^4y^2 - 36x^3y^6$
35) $16x^2 - 9y^2$ 36) $1.7x^2 - 0.04x + 3$ 37) $9x^3 + 12x^2 - 35x - 50$
38) $8a^2 + 24a - 11b - 7b^2$ 39) $x^4 - x^3 - 60x^2 - 43x - 5$ 40) $-16a^{42}b^{33}$
41) $\frac{-8w^8x^5z^3}{81}$ 42) His salary was \$15. 43) The temperature is 9° C.
44) His salary was \$2,500. 45) $y = 5$ 46) $y = -2x + 16$
47) $y = \frac{5}{4}x - 2$ 48) $y = -\frac{8}{3}x - \frac{26}{3}$ 49) $y = \frac{3}{5}x + 1$
50) $y = \frac{3}{7}x - \frac{55}{7}$ 51) $x = -0.5$ 52) $y = -11$

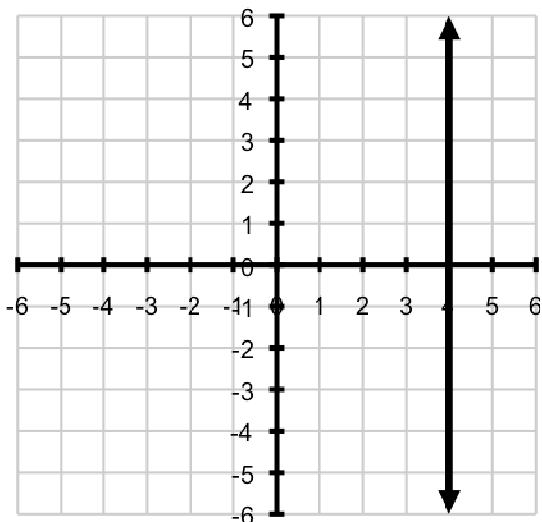
- 53) The Slope is $-\frac{1}{3}$.
The y-intercept is $(0, -2)$.



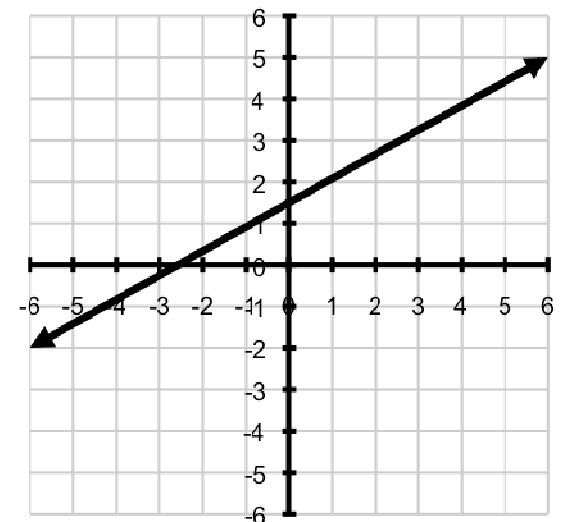
- 54) The Slope is 2.
The y-intercept is $(0, -8)$.



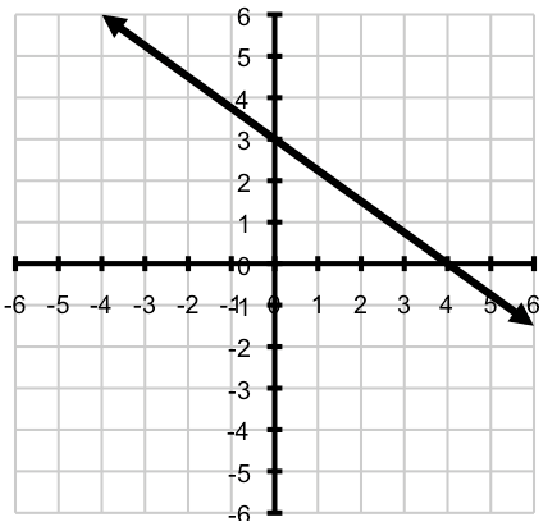
- 55) The Slope is undefined.
There is no y-intercept.



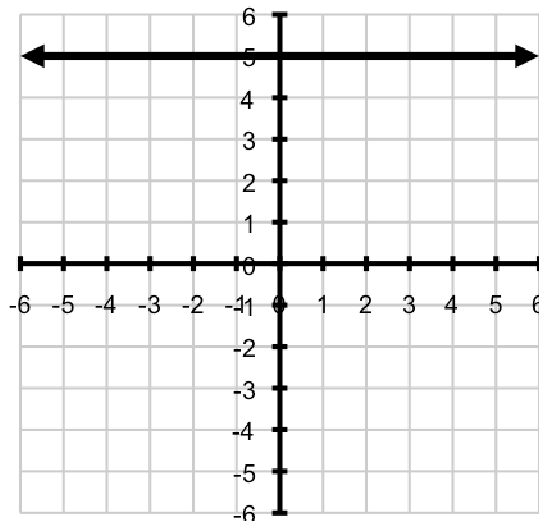
- 56) The Slope is $\frac{3}{5}$.
The y-intercept is $(0, 1.5)$.



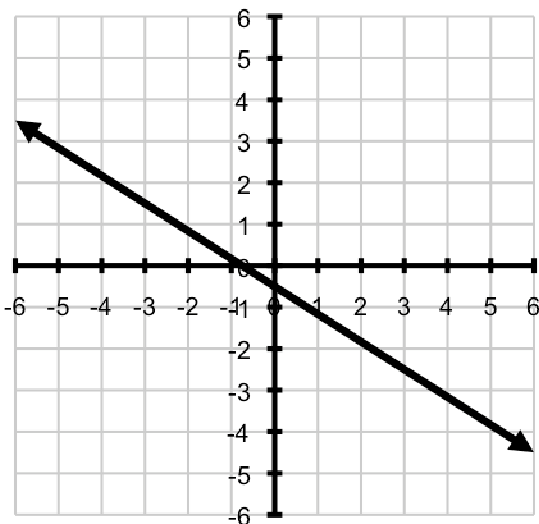
- 57) The x-intercept is (4, 0).
The y-intercept is (0, 3).



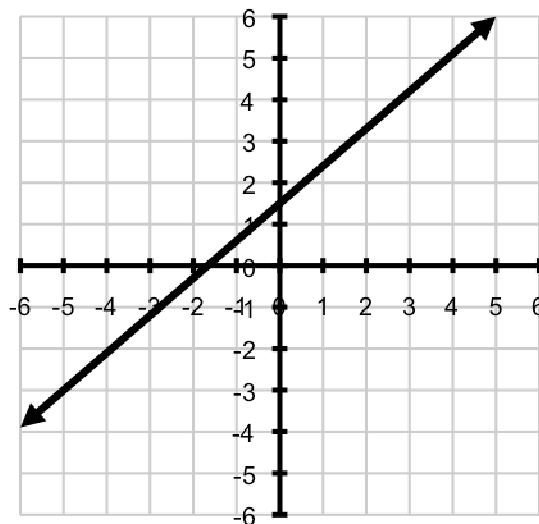
- 58) There is no x-intercept.
The y-intercept is (0, 5).



- 59) The x-intercept is $(-\frac{3}{4}, 0)$.
The y-intercept is $(0, -\frac{1}{2})$.

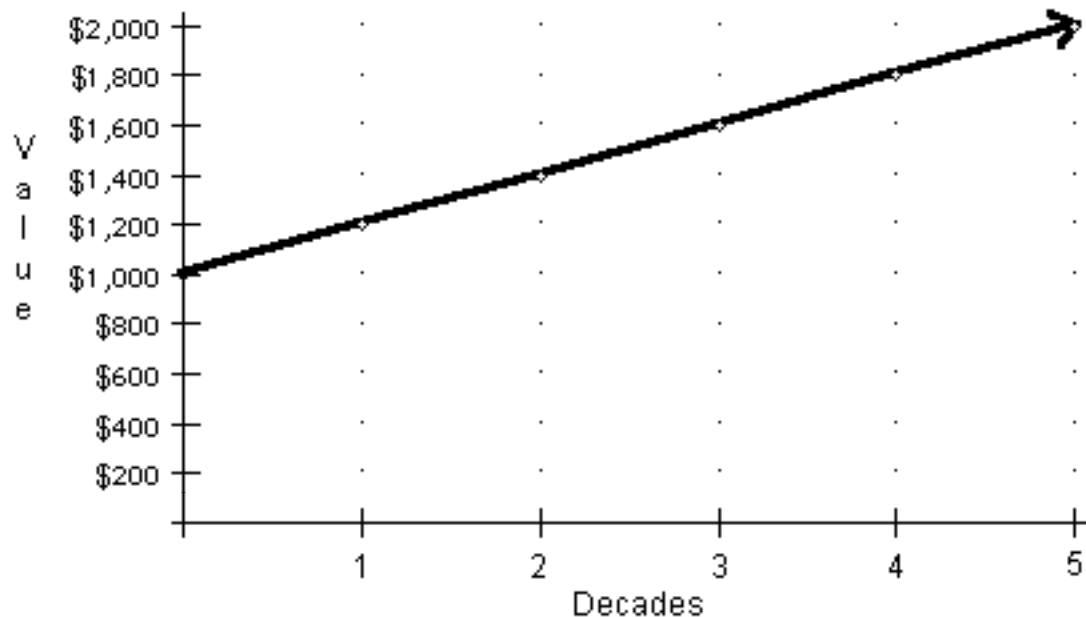


- 60) The x-intercept is $(-\frac{5}{3}, 0)$.
The y-intercept is $(0, \frac{3}{2})$.



- 61a) -6.75×10^4 61b) 4.52×10^{-3} 62a) -0.0000324 62b) 8,140,000
 63) 5×10^{98} 64) -1.2×10^{70} 65a) The coefficient is -4 .
 65b) The variable terms are $8x^2z$, $-4px$, and $7x$. The constant term is -21 .
 66) $13x^2(4x - y)$ 67) $5(x - 4y)(x + 4y)$ 68) $(x - 6)(x - 3)$
 69) $7a^4b^3(2a + 3b)$ 70) $x^2 + 16$ or prime 71) $(y - a)(x + 4)(x^2 - 4x + 16)$

- 72) $16(x-2)(x+2)$ 73) $(x-10y)(x+y)$
 74) $(3x-2)(9x^2+6x+4)(y+z)(y^2-yz+z^2)$ 75) $(x-4)(x+4)(x^2+9)$
 76) $\frac{1}{7}(11x-3y)^2$ 77) $12x(x^2+x+25)$ 78) $-(x+4y)(3x-2y)$
 79) $7x^2y^2(5x+2y-1)$ 80) $(a^2+b^2)(x-4)(x-1)$ 81) $3(x^2+64)$
 82) $(3x-5)(4x+7z)$ 83) $9xy(x+3y)^2$ 84) $(y-z)(x-9)(x+1)$
 85) $-\frac{4y}{3z^6}$ 86) $3x-6y+4xy$ 87) $1-2x+\frac{3}{x}$ 88) $\frac{3a}{b}-4+\frac{2b}{a}$
 89) $4x+3-\frac{3}{3x-4}$ 90) $x^2-14x+50-\frac{113}{x+3}$ 91) $4x^2-5x+6$
 92a) always 92b) never 92c) sometimes 92d) always 92e) never
 93) $v = 200d + 1000$, where d is the number of decades and v is the value.



- 94) The rate of descent is $-\frac{2}{15}$.
 95) It takes five seconds.
 96) The base is 14 inches and the height is 10 inches.
 97) The legs are 15 cm and 36 cm respectively and the hypotenuse is 39 cm.
 98) The square was 5 inches by 5 inches.
 99) The larger pipe takes six hours whereas the smaller pipe takes ten hours.
 100) $(-\infty, -3) \cup (-3, -2) \cup (-2, 2) \cup (2, \infty)$
 101) $(-\infty, -3) \cup (-3, 0) \cup (0, \frac{5}{6}) \cup (\frac{5}{6}, \infty)$
 102) $(-\infty, \frac{9}{2}) \cup (\frac{9}{2}, 11) \cup (11, \infty)$ 103) $(-\infty, \infty)$

- 104) $\frac{x}{x^2+4}$ 105) $\frac{1}{(x-4)(x+1)}$ 106) $\frac{(3x+1)(2x-3)}{(x-5)^2}$ 107) $\frac{x-3}{(x+4)(3x-2)}$
- 108) $\frac{5x+3}{5x-3}$ 109) $\frac{14}{(5x+3)(x+9)}$ 110) $\frac{5x+6}{2}$ 111) $\frac{5}{2}$
- 112) $\frac{-7}{2x+1}$ 113) $\frac{x-3}{x(x-2)}$
- 114) The x-intercept is $(-6, 0)$.
There is no y-intercept.
The equation is $x = -6$.
- 115) The x-intercept is $(5, 0)$.
The y-intercept is $(0, 3)$.
The equation is $y = -\frac{3}{5}x + 3$.
- 116) There is no x-intercept.
The y-intercept is $(0, -2)$.
The equation is $y = -2$.
- 117) The x-intercept is $(4, 0)$.
The y-intercept is $(0, -2)$.
The equation is $y = \frac{1}{2}x - 2$.
- 118) $y \approx 41.569$ ft 119) $h \approx 4.33$ ft 120) $x = 9$ m
- 121) $\left\{-\frac{38}{51}\right\}$ 122) $\{14\}$ 123) $\{3\}$
- 124) $\{\}$ 125) $\{\}$ 126) $\left\{\frac{2}{3}\right\}$ 127) The diagonal is ≈ 21.213 ft long.
- 128a) The armies are ≈ 15.23 miles apart.
- 128b) They will be 2 miles south and 1 mile east of Warrington when they meet.
- 129) He has to throw the ball ≈ 137.28 ft
- 130) $m\angle C = 50^\circ$, $AC = \frac{34}{7}$ cm or $4\frac{6}{7}$ cm
- 122) $AC = 20$ m, $BC = 12$ m, $DE = 16$ m, $m\angle C = 48.6^\circ$
- 123) The tree is 37.5 feet tall 124) $PY = 13.5$ in
- 125) It will take the printers 7.875 hours to complete the job.
- 126) Leroy was driving at 72 mph and Juanita was driving at 84 mph.
- 127) She can paddle 8 mph. 128) It takes Cindy 20 hr. & Larry 30 hr.
- 129) 4840 men and 5628 women voted in the election.
- 130) $y = 2x + 14$
- 131) $y = -\frac{4}{3}x + 13$ 132) $x = 3.2$ 133a) $m = \frac{4250}{3}$
- 133b) $y = \frac{4250}{3}x + 28850$ 133c) The median home value will be $\approx \$129,400$.