

Review for Final Exam Second Semester

Evaluate each expression.

1) $-\frac{20}{7-5} \times 10$

$$-\frac{20}{2} \times 10$$

$$-10 \times 10 \quad \boxed{-100}$$

3) $(-3) \times \left(\frac{-15}{-3}\right) - (-8)$

$$-3 \times 5 + 8$$

$$-15 + 8$$

$$\boxed{-7}$$

Simplify each expression.

5) $-9 + 10(-3m - 4)$

$$-9 - 30m - 40$$

$$\boxed{-49 - 30m}$$

7) $-(x - 6) - 1$

$$-x + 6 - 1$$

$$\boxed{-x + 5}$$

9) $4 + 5p + 9p$

$$\boxed{14p + 4}$$

2) $(-7) + 7^2 - 6$

$$-7 + 49 - 6$$

$$\boxed{36}$$

4) $((-7) - 7)(10 - 4)$

$$(-14)(6)$$

$$\boxed{-84}$$

6) $4(5 - 2x) - 8x$

$$20 - 8x - 8x$$

$$\boxed{-16x + 20}$$

8) $-8(5x - 7) + 6x$

$$-40x + 56 + 6x$$

$$\boxed{-34x + 56}$$

10) $-10 + 10v + 9v + 3$

$$\boxed{19v - 7}$$

Solve each equation.

11) $5 = -3x + 2$

$$-2 = -3x$$

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

$$\boxed{-1 = x}$$

12) $-49 = 7(k - 2)$

$$-49 = 7k - 14$$

$$+14 \quad +14$$

$$-35 = 7k$$

$$\frac{-35}{7} = \frac{7k}{7}$$

$$\boxed{-5 = k}$$

Solve each proportion.

$$13) \frac{7}{x+10} = \frac{6}{3} (x+10)$$

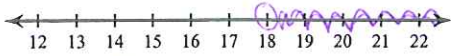
$$3 \cdot 7 = \frac{6(x+10)}{3} \cdot 3$$

$$21 = 6x + 60$$

$$\begin{aligned} -39 &= 6x \\ \frac{-39}{6} &= \frac{6x}{6} \\ x &= -6.5 \end{aligned}$$

Solve each inequality and graph its solution.

$$15) 9 < 8 + \frac{a}{18}$$



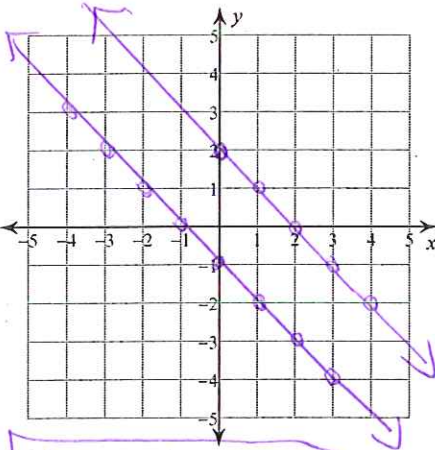
$$18 \cdot 1 < \frac{a}{18} \cdot 18$$

$$18 < a$$

$$a > 18$$

Solve each system by graphing.

$$17) \begin{aligned} y &= -x - 1 \\ y &= -x + 2 \end{aligned}$$



No solution
(lines are parallel)

Solve each system by elimination.

$$19) \begin{aligned} 4x + 2y &= 2 \\ + \quad -x - 2y &= 13 \end{aligned}$$

$$3x = 15$$

$$x = 5$$

$$-5 - 2y = 13$$

$$-2y = 18$$

$$y = -9$$

(5, -9)

$$20) \begin{aligned} -5x + y &= -13 \\ (-3x + y) &= -9 \\ \hline 5x - y &= 13 \end{aligned}$$

$$2x = 4$$

$$x = 2$$

$$-3(2) + y = -9$$

$$-6 + y = -9$$

$$y = -3$$

(2, -3)

$$14) \frac{p+4}{5} = \frac{8}{4} \cdot 5$$

$$p+4 = \frac{40}{4}$$

$$p+4 = 10$$

$$p = 6$$

$$16) \frac{a}{15} - 6 \leq -7$$



$$\frac{a}{15} \leq -1$$

$$a \leq -15$$

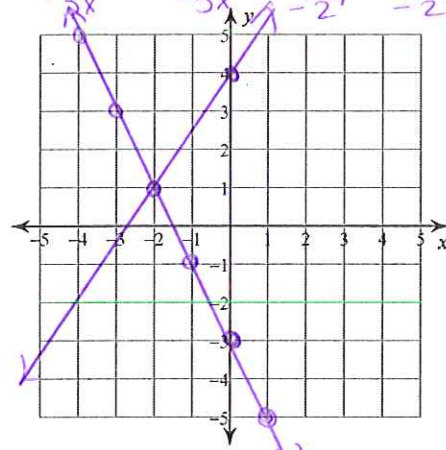
$$18) \begin{aligned} 2x + y &= -3 \\ 3x - 2y &= -8 \end{aligned}$$

$$y = -2x - 3$$

$$3x - 2y = -8$$

$$-2y = -3x - 8$$

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



Solution: (-2, 1)

$$\begin{array}{r} 21) \quad 3x - y = 9 \\ \quad 8x - 11y = -1 \\ \quad -33x + 11y = -99 \end{array}$$

$$\begin{array}{r} -25x = -100 \\ x = 4 \end{array}$$

$$(4, 3)$$

$$\begin{array}{r} 3(4) - y = 9 \\ -12 \quad -12 \\ -y = -3 \\ y = 3 \end{array}$$

Solve each system by substitution.

$$\begin{array}{l} 22) \quad y = -7x + 15 \\ \quad y = x - 9 \end{array}$$

$$\begin{array}{r} -7x + 15 = x - 9 \\ -8x + 15 = -9 \\ -15 \quad -15 \\ -8x = -24 \\ x = 3 \end{array}$$

$$\begin{array}{l} y = 3 - 9 \\ y = -6 \end{array}$$

$$(3, -6)$$

$$\begin{array}{l} 23) \quad 7x + 2y = 23 \\ \quad y = -6 \end{array}$$

$$\begin{array}{r} 7x + 2(-6) = 23 \\ \quad +12 \quad +12 \\ 7x = 35 \\ x = 5 \end{array}$$

$$(5, -6)$$

$$\begin{array}{l} 24) \quad x + 5y = -7 \\ \quad 3x - 3y = -3 \end{array}$$

$$x = -5y - 7$$

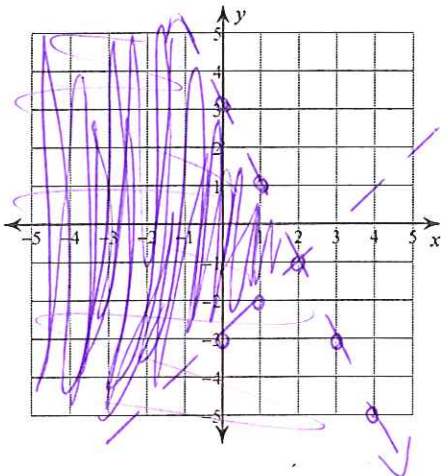
$$\begin{array}{l} x + 5(-1) = -7 \\ x = -2 \end{array}$$

$$\begin{array}{r} 3(-5y - 7) - 3y = -3 \\ -15y - 21 - 3y = -3 \\ -18y - 21 = -3 \\ +21 \quad +21 \\ -18y = 18 \\ y = -1 \end{array}$$

$$(-2, -1)$$

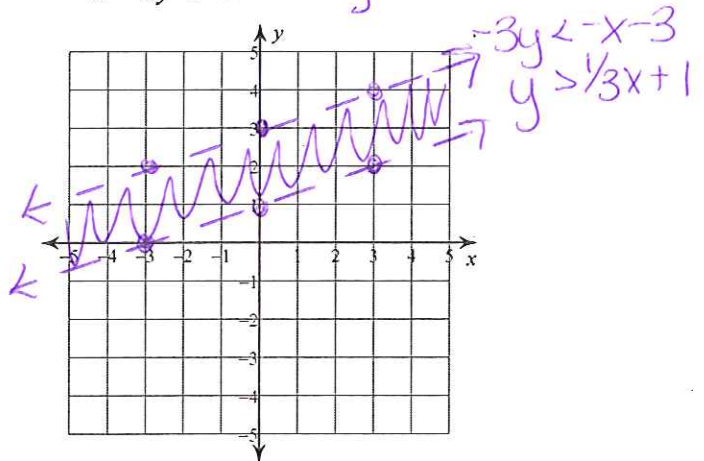
Sketch the solution to each system of inequalities.

$$\begin{array}{l} 25) \quad y < -2x + 3 \\ \quad y > x - 3 \end{array}$$



$$\begin{array}{l} 26) \quad x - 3y > -9 \\ \quad x - 3y < -3 \end{array}$$

$$\begin{array}{l} -3y > -x - 9 \\ y < \frac{1}{3}x + 3 \end{array}$$



- 27) Ryan and Heather are selling cheesecakes for a school fundraiser. Customers can buy pecan cheesecakes and chocolate marble cheesecakes. Ryan sold 12 pecan cheesecakes and 9 chocolate marble cheesecakes for a total of \$237. Heather sold 12 pecan cheesecakes and 4 chocolate marble cheesecakes for a total of \$152. Find the cost each of one pecan cheesecake and one chocolate marble cheesecake.

$x = \text{cost of pecan cake}$
 $y = \text{cost of choc. cake}$

$$\begin{array}{r} 12x + 9y = 237 \\ -12x + 4y = -152 \\ \hline 5y = 85 \\ y = 17 \end{array}$$

$$\begin{aligned} 12x + 9(17) &= 237 \\ 12x &= 84 \\ x &= 7 \end{aligned}$$

A pecan cheesecake costs \$7
 and a chocolate marble
 cheesecake costs \$17.

- 28) Dan and Kim each improved their yards by planting rose bushes and geraniums. They bought their supplies from the same store. Dan spent \$71 on 7 rose bushes and 3 geraniums. Kim spent \$85 on 5 rose bushes and 9 geraniums. Find the cost of one rose bush and the cost of one geranium.

$x = \text{cost of a rose bush}$
 $y = \text{cost of a geranium}$

$$\begin{array}{r} 5(7x + 3y = 71) \\ -7(5x + 9y = 85) \end{array}$$

$$\begin{array}{r} 35x + 15y = 355 \\ -35x - 63y = -595 \\ \hline -48y = -240 \end{array}$$

$$y = 5$$

$$\begin{aligned} 7x + 3(5) &= 71 \\ 7x &= 56 \\ x &= 8 \end{aligned}$$

A rose bush costs \$8
 and a geranium
 costs \$5.

- 29) Trevon's school is selling tickets to a play. On the first day of ticket sales the school sold 10 senior citizen tickets and 13 child tickets for a total of \$273. The school took in \$127 on the second day by selling 3 senior citizen tickets and 8 child tickets. What is the price each of one senior citizen ticket and one child ticket?

$x = \text{price of a senior ticket}$
 $y = \text{price of a child ticket}$

$$\begin{array}{r} -3(10x + 13y = 273) \\ 10(3x + 8y = 127) \end{array}$$

$$\begin{array}{r} -30x - 39y = -819 \\ 30x + 80y = 1270 \end{array}$$

$$\begin{aligned} 41y &= 451 \\ y &= 11 \end{aligned}$$

$$3x + 8(11) = 127$$

$$\begin{aligned} 3x &= 39 \\ x &= 13 \end{aligned}$$

A senior citizen
 ticket costs \$13
 and a child ticket
 costs \$11.

Simplify. Your answer should contain only positive exponents.

30) $3x^2y^4 \cdot 3x^{-2}y^2$

$$\frac{9x^2y^6}{x^2} = 9y^6$$

31) $(4a^0b^{-1})^2$

$$4^2 a^0 b^{-2} = \frac{16}{b^2}$$

$$32) \frac{yx^3}{2x^2y^{-3}} = \frac{yx^3y^3}{2x^2} = \frac{xy^4}{2}$$

$$33) \frac{(2m^{-1})^{-4}}{2nm^2 \cdot 2m^{-4}} = \frac{2^{-4}m^4m^4}{4nm^2} = \frac{m^4}{64n}$$

Write each number in scientific notation.

34) 440000

$$4.4 \times 10^5$$

35) 0.068

$$6.8 \times 10^{-2}$$

Write each number in standard notation.

36) 3×10^{-5}

$$.00003$$

37) 7.2×10^4

$$72000$$

Name each polynomial by degree and number of terms.

38) $7x^3 - 8x^2 + 6$

cubic trinomial

39) $-6n$

linear monomial

Simplify each expression.

40) $(2n + 7n^4) + (n^4 + n)$

$$8n^4 + 3n$$

41) $(5k + 3k^3 + 4) + (5k^3 + 4 - 6k)$

$$-2k^3 + 11k$$

Find each product.

42) $6r(6r - 8)$

$$36r^2 - 48r$$

43) $(5x - 6)(6x - 1)$

$$30x^2 - 5x - 36x + 6$$

$$30x^2 - 41x + 6$$

44) $(3r^2 + r + 8)(5r^2 + 3r - 1)$

$$15r^4 + 9r^3 - 3r^2$$

$$+ 5r^3 + 3r^2 - r$$

$$+ 40r^2 + 24r - 8$$

45) $(6 + 5a)(6 - 5a)$

$$36 - 30a + 30a - 25a^2$$

$$-25a^2 + 36$$

$$15r^4 + 14r^3 + 40r^2 + 23r - 8$$

46) $(7p-6)^2$

$(7p-6)(7p-6)$
 $49p^2 - 42p - 42p + 36$
 $49p^2 - 84p + 36$

Factor each completely.

47) $m^2 - 10m + 24$

Mult: 24
Add: -10
 $(m-4)(m-6)$

48) $3x^2 - 7x$

$x(3x-7)$

49) $9a^2 + 29a - 28$

Mult: -252
Add: 29
36, -7
 $(9a^2 + 36a) - 7a - 28$
 $9a(a+4) - 7(a+4)$
 $(a+4)(9a-7)$

50) $45v^2 - 140v + 100$

Mult: 180
Add: -28
-18, -10
 $5(9v^2 - 28v + 20)$
 $(9v^2 - 18v) - 10v + 20$
 $9v(v-2) - 10(v-2)$
 $5(v-2)(9v-10)$

51) $16n^2 - 36n - 70$

Mult: -280
Add: -18
-28, 10
 $2(8n^2 - 18n - 35)$
 $(8n^2 - 28n) + (10n - 35)$
 $4n(2n-7) + 5(2n-7)$
 $2(2n-7)(4n+5)$

52) $40m^2 - 85m + 45$

Mult: 72
Add: -17
-8, -9
 $5(8m^2 - 17m + 9)$
 $(8m^2 - 8m) - 9m + 9$
 $8m(m-1) - 9(m-1)$
 $5(m-1)(8m-9)$

53) $16x^2 - 9$

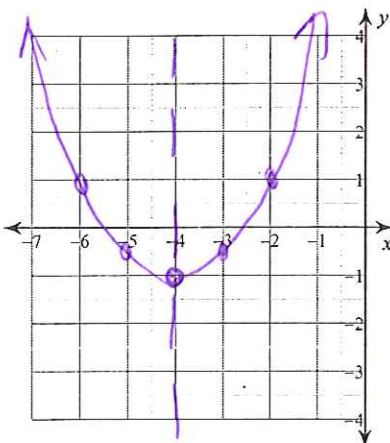
$(4x-3)(4x+3)$

54) $9x^2 + 30x + 25$

$(3x+5)(3x+5)$
 or
 $(3x+5)^2$

Sketch the graph of each function.

55) $y = \frac{1}{2}x^2 + 4x + 7$



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

$\frac{1}{2}(-4)^2 + 4(-4) + 7$

$8 - 16 + 7$

-1

$(-4, -1)$

over 1 up 1 $(\frac{1}{2})$
 over 2 up 4 $(\frac{1}{2})$

Solve each equation by factoring.

56) $v^2 + 25 = 10v$
 $-10v \quad -10v$

$v^2 - 10v + 25 = 0$
 $(v-5)(v-5) = 0$
 $v-5 = 0 \quad \boxed{v=5}$

57) $k^2 + 12 = 8k$
 $-8k \quad -8k$

$k^2 - 8k + 12 = 0$
 $(k-6)(k-2) = 0$
 $k-6 = 0 \quad k-2 = 0$

Solve each equation with the quadratic formula.

58) $10n^2 - 1 = n$
 $-n \quad -n$

$10n^2 - n - 1 = 0$
 $a: 10 \quad b: -1 \quad c: -1$
 $b^2 - 4ac = 41$
 $2a: 20$

$x = \frac{1 \pm \sqrt{41}}{20}$
 OR
 $0.37, -0.27$

59) $4p^2 = -p + 33$
 $+p-33 \quad +p-33$

$4p^2 + p - 33 = 0$
 $a: 4 \quad b: 1 \quad c: -33$
 $b^2 - 4ac: 529$

$x = \frac{-1 \pm \sqrt{529}}{8}$
 $x = \frac{-1 \pm 23}{8}$
 $\frac{22}{8}, \frac{-24}{8}$
 $\left\{ \frac{11}{4}, -3 \right\}$

Find the discriminant of each quadratic equation then state the number and type of solutions.

60) $6x^2 + x + 7 = 7$
 $-7 \quad -7$

$6x^2 + x = 0$

$a: 6 \quad b: 1 \quad c: 0$
 $b^2 - 4ac: 1^2 - 4(6)(0)$

Simplify.

discriminant: 1
 2 solutions

61) $2n^2 - 4n + 9 = 7$
 $-7 \quad -7$

$2n^2 - 4n + 2 = 0$

$(-4)^2 - 4(2)(2)$

$16 - 16$
 0

discriminant: 0
 one solution

62) $\sqrt{12}$

$\sqrt{4 \cdot 3}$
 $\boxed{2\sqrt{3}}$

63) $6\sqrt{32}$

$6\sqrt{16 \cdot 2}$
 $\boxed{24\sqrt{2}}$

64) $\sqrt{32k^2}$

$\sqrt{16 \cdot 2}$
 $\boxed{4k\sqrt{2}}$

65) $-5\sqrt{252r^4}$

$-5\sqrt{36 \cdot 7 r^4}$
 $\boxed{-30r^2\sqrt{7}}$

66) $2\sqrt{80a^4}$

$2\sqrt{16 \cdot 5 a^4}$
 $\boxed{8a^2\sqrt{5}}$

67) $-\sqrt{180m^4n^2}$

$-\sqrt{36 \cdot 5}$
 $\boxed{-6m^2n\sqrt{5}}$

68) $\sqrt{144x^2y^4}$

$\boxed{12xy^2}$

