

# FINAL EXAM REVIEW

Math 200 – Spring 2007

The final exam will be on Monday, May 14 from 7:00-9:00 in room \_\_\_\_\_.

The exam will cover all material covered in class this semester, all of chapters 1, 2, 3, and 7. All of the Geometry Sections. Plus the following sections:

4.1 – 4.4

6.1 – 6.5, 6.7

8.1 – 8.3, 8.6

9.1, 9.2

10.1

No homework is due at the exam.

You may use your calculator on this exam.

You may NOT use your notes, homework, book, or neighbors on this exam. You do get an 8<sup>1</sup>/<sub>2</sub> X 11 “cheat-sheet” for this exam.

Below is a review for this exam. Anything on the review could possibly be on the exam. The exam will be shorter than the review.

## Math 0200 Final Exam Review

1. Simplify:  $24 \div 8 \cdot 3 + 28 \div (-7)$
2. Simplify:  $\frac{11 - (-9) + 6(10 - 4)}{2 + 3 \cdot 4}$
3. Simplify  $-(-5x + 7) - 3(2 - x) - 8x - 6$
4. Simplify:  $(4x^3)^{-2} \cdot x^9$
5. Simplify:  $\left(\frac{x^4}{x^7}\right)^{-3}$
6. Evaluate  $x^3 - 4x^2y + 2y - 5$  when  $x = -2$  and  $y = -3$

For exercises 7-9, solve for  $x$ .

7.  $2(x - 3) + 5x = 8(x - 1)$
8.  $\frac{2x}{3} + \frac{1}{5} = 1 + \frac{3x}{5} - \frac{1}{3}$
9.  $\frac{x + 2}{3} = \frac{x}{6}$

For problems 10-15, define a variable in words, write an equation, solve algebraically, and write your answer in a complete sentence.

10. Seven subtracted from five times a number is 208. Find the number
11. An 87-inch board is cut into three pieces. The longest piece is 10 inches longer than twice the shortest piece and the middle-sized piece is 17 inches longer than the shortest piece. How long are the pieces?
12. A landscape architect charged a customer \$971, listing \$350 for plants and the remainder for labor. If the architect charged \$23 per hour, how many hours did the architect work?
13. A university with 176 people on the faculty wants to maintain a student-to-faculty ratio of 23:2. How many students should they enroll to maintain that ratio?
14. To earn a B in a course, a student must have a final average of at least 80%. On the first three examinations, a student has scores of 76%, 74%, and 78%. What must the student earn on the fourth examination to earn a B in the course?
15. A motorcycle traveling at 50 mph overtakes a car traveling at 30 mph that had a three-hour head start. How far from the starting point are the two vehicles.

Write each of the values below in decimal or standard notation.

16.  $3.113 \times 10^{-5}$

17.  $1.201 \times 10^9$

Write each of the values below in scientific notation.

18. 87,000,000

19. 0.000017

Perform the indicated operations. Leave your answer in simplified form.

20.  $(-2x^2y + 9xy + xy^2 + 21) + (-4xy + 3xy^2 - 11)$

21.  $(7x^2y - 8xy + 11) - (7x^2y + 9xy + x - 21)$

22.  $3a^3b(7a^3b^2 + ab^2 - 4a)$

23.  $(2y + 4)(-3y + 1)$

24.  $3y^3(2y^2 - 3y + 11)$

25.  $(x - 9)(x + 9)$

Completely factor each of the following expressions. If the expression cannot be factored write "PRIME".

26.  $m^2 + 12m + 36$

27.  $r^2 + 4$

28.  $2v^2 - v - 3$

29.  $p^2 - 100$

30.  $t^2 + 2t - 15$

31.  $2x^3 + 8x^2 + 6x$

Perform the indicated operations and simplify the answer.

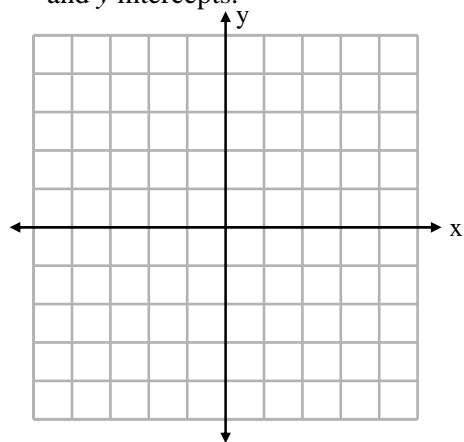
32.  $\frac{p-7}{p-2} + \frac{2p+1}{p-2}$

33.  $\frac{3c-7}{c+2} - \frac{2c-9}{c+2}$

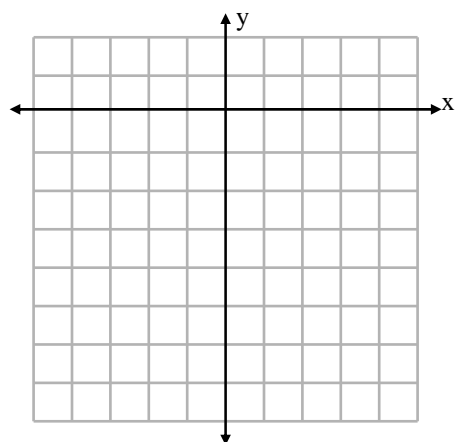
34. Solve  $P = 2l + 2w$  for  $w$

35. Solve  $S = P + Prt$  for  $t$

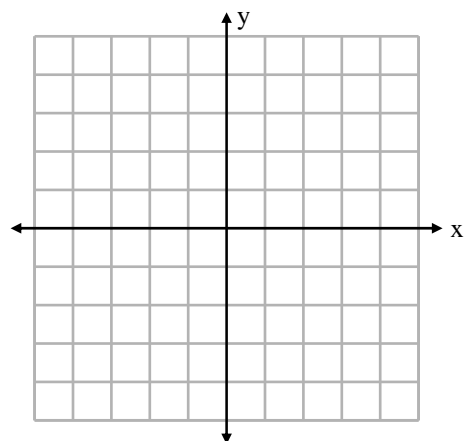
36. Sketch the line  $5x + 4y = 20$  using  $x$ - and  $y$ -intercepts and a checkpoint on the axis provided. Label the  $x$  and  $y$  intercepts.



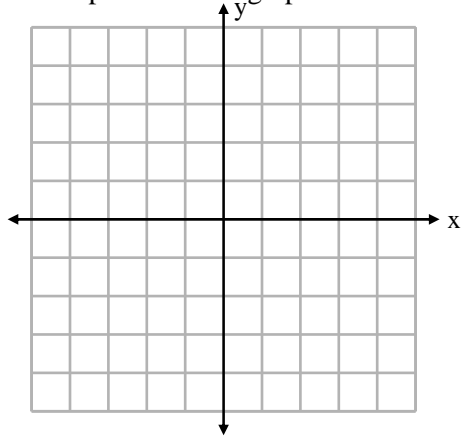
37. Sketch the line  $y = 3x - 6$  using  $x$ - and  $y$ -intercepts and a checkpoint on the axis provided and label the  $x$  and  $y$  intercepts.



38. Use the slope and  $y$ -intercept to sketch  $y = -\frac{1}{2}x + 3$  on the axes provided. State the slope and the  $y$ -intercept.



39. Sketch the line with slope  $m = \frac{2}{3}$  that contains the point  $(-1, -3)$ . Label the given point and at least 2 other points on the graph.



40. Find an equation for the line with y-intercept of  $(0,4)$  and parallel to the line  $y = 3x - 2$ . Leave the final answer in slope-intercept form.
41. Find the slope of the line that passes through the points  $(3, -4)$  and  $(5, 0)$ .
42. Find an equation for the line with undefined slope which passes through the point  $(-7, 2)$ .
43. Find an equation for the line with slope of  $-\frac{1}{2}$  which passes through the point  $(0, -1)$

Simplify each expression. Leave your answer in the form of a simplified radical, if necessary.

44.  $\frac{\sqrt{49} \cdot \sqrt{54}}{\sqrt{6}}$

45.  $\sqrt{25-16}$

46.  $\sqrt{25} - \sqrt{16}$

47.  $\frac{\sqrt{16x}}{\sqrt{2x}}$

48.  $\sqrt{18a^7b^6}$

Use the product rule for square roots to simplify. DO NOT use a calculator to approximate an answer.

49.  $\sqrt{72}$

50.  $\sqrt{40}$

51.  $\sqrt{34}$

52.  $\sqrt{700}$

53. The length of a rectangular garden is 4 feet longer than the width. If the area of the garden is 140 sq. feet, find the dimensions of the garden.

Solve the quadratics using the method of your choice.

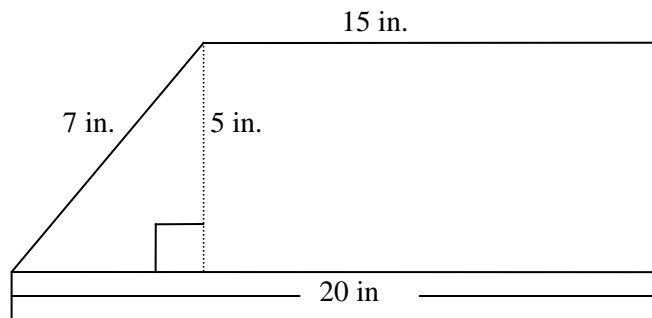
54.  $16t^2 - 4 = 0$

55.  $3x^2 + x = 10$

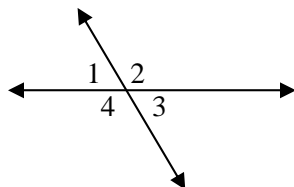
56.  $8x^2 + 2x = 1$

57. A sailboat has a triangular sail with an area of 126 square feet and a base that measures 12 feet. Find the height of the sail.

58. Find the area and perimeter of the figure.

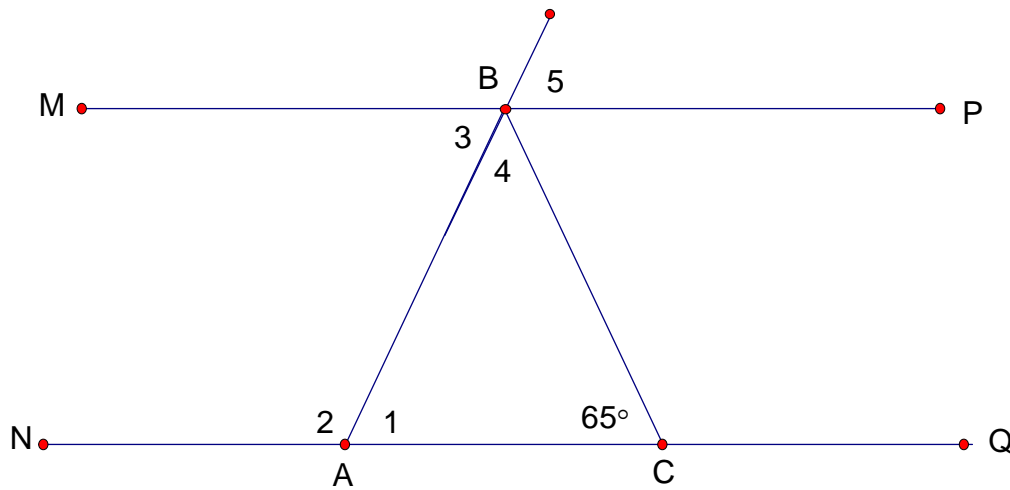


59. If  $m\angle 2 = 135^\circ$ , find the measure of the remaining angles.



60. If  $m\angle A = 6x$  and  $m\angle B = x + 5$  and the angles are supplementary, find the measure of the angles.

61. In the given figure  $\overline{MP} \parallel \overline{NQ}$  and  $\overline{AB} \cong \overline{BC}$



a) Classify triangle  $ABC$  in the figure above.

a. \_\_\_\_\_

b) Find the measures of angles 1-5 in the figure above.

$m\angle 1 =$  \_\_\_\_\_

$m\angle 2 =$  \_\_\_\_\_

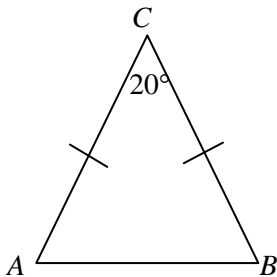
$m\angle 3 =$  \_\_\_\_\_

$m\angle 4 =$  \_\_\_\_\_

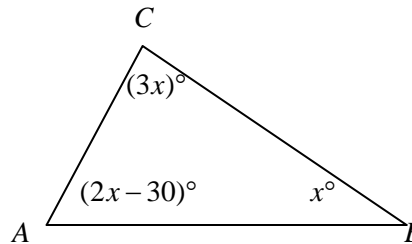
$m\angle 5 =$  \_\_\_\_\_

In the given figures, find the measures of the remaining angles.

62.



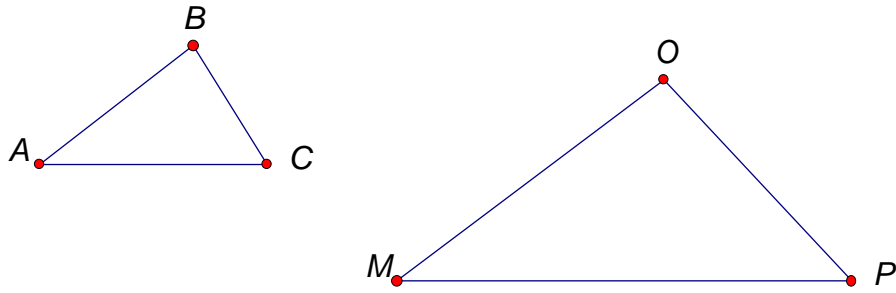
63.



64. Answer the following true or false:

- An obtuse triangle can have 3 obtuse angles.
- All isosceles triangles have 2 congruent sides and two congruent angles.
- An equilateral triangle is also equiangular.

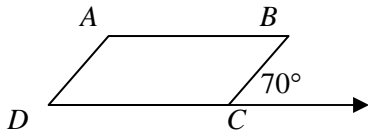
For exercises 65-66, use the figure below where  $\triangle ABC \sim \triangle MOP$ .



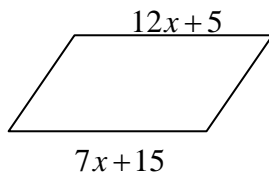
65. Name the congruent angles and the proportional sides.
66. Find  $BC$  if  $AB = 8$ ,  $MO = 104$  and  $OP = 78$ .
67. Find the height of a tree that casts an 80 foot shadow at the same time that a telephone pole 18 feet tall casts a 12 foot shadow.
68. Complete the following table:

Polygon	Number of sides of polygon
hexagon	
triangle	
octagon	
quadrilateral	
pentagon	

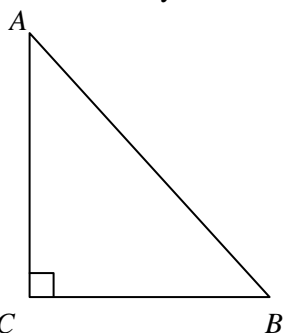
69. Draw an octagon and state the number of diagonal in the octagon.
70. Find the measures of the angles in the given parallelogram.



71. For the given parallelogram, find  $x$



72. Use the Pythagorean Theorem to find the lengths of the missing sides of the right triangle in the table below. Leave your answers in simplified radical form. Assume all units are in centimeters.



	$AB$	$BC$	$CA$
a)	10	8	
b)	12		10
c)		15	8

73. Solve the following problem by A) defining a variable, B) writing an equation, C) solving the equation and D) answering the question in a complete sentence.

A 13 foot ladder is set 5 feet from the base of the wall. How far up the wall will the ladder reach?

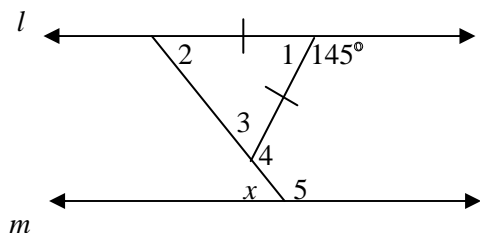
74. Solve the inequality, show the answer in set notation and graph your solution on the number line.

$$-30 < \frac{y}{5}$$

75. Solve the inequality, show your answer in interval notation and graph your solution on the number line.

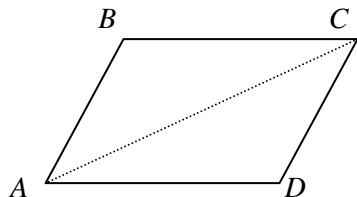
$$33x + 33 \geq 3(4x + 3)$$

76. If  $l \parallel m$ , find  $x$  and justify the answer.



Use the figure below for exercises 77-78.

The figure  $ABCD$  is a parallelogram with diagonal  $\overline{AC}$ . Assume that  $m\angle BAC = 25^\circ$  and  $m\angle CDA = 110^\circ$



77. Find  $m\angle CAD$  and justify the answer.

78. Find  $m\angle ACD$  and justify your answer.

79. If the diameter of a circle is 10 cm, find the circumference and area of the circle. Leave the answer in terms of  $\pi$ .

80. Divide and simplify your answer.

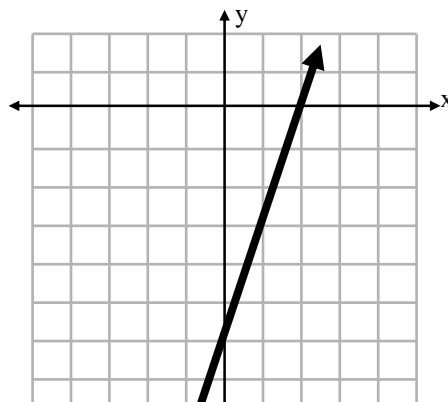
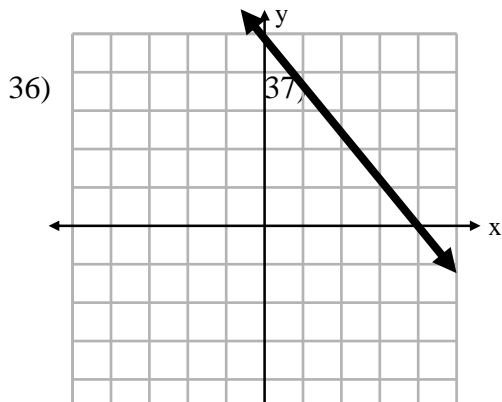
$$\frac{4x+8}{x^2-2x} \div \frac{5x+10}{5x-10}$$

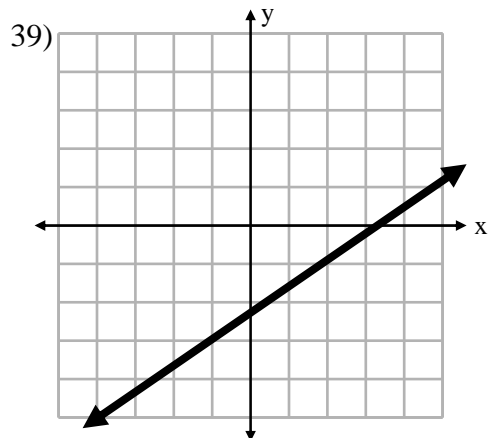
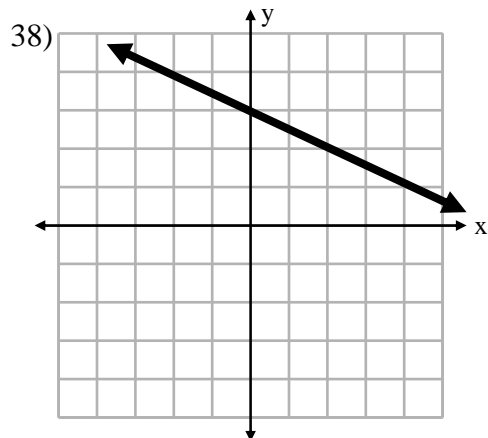
81. Solve the equation and state any restrictions.

$$\frac{7}{x+5} = \frac{2}{x}$$

Math 0200 Final Exam Review Solutions

- 1) 5
- 2) 4
- 3) -19
- 4)  $\frac{x^3}{16}$
- 5)  $x^9$
- 6) 29
- 7)  $x = 2$
- 8)  $x = 7$
- 9)  $x = -4$
- 10) The number is 43.
- 11) The lengths of the pieces are 15 inches, 32 inches and 40 inches.
- 12) The architect worked 27 hours.
- 13) They should enroll 2024 students.
- 14) The student needs 92% or better on test 4 to earn a B in the course.
- 15) It is 225 miles from the starting point.
- 16) 0.00003113
- 17) 1,201,000,000
- 18)  $8.7 \times 10^7$
- 19)  $1.7 \times 10^{-5}$
- 20)  $-2x^2y + 5xy + 4xy^2 + 10$
- 21)  $-x - 17xy + 32$
- 22)  $21a^6b^3 + 3a^4b^3 - 12a^4b$
- 23)  $-6y^2 - 10y + 4$
- 24)  $6y^5 - 9y^4 + 33y^3$
- 25)  $x^2 - 81$
- 26)  $(x + 6)^2$
- 27) Prime
- 28)  $(2v - 3)(v + 1)$
- 29)  $(p - 10)(p + 10)$
- 30)  $(t + 5)(t - 3)$
- 31)  $2x(x + 3)(x + 1)$
- 32) 3
- 33) 1
- 34)  $w = \frac{P - 2l}{2}$
- 35)  $t = \frac{S - P}{Pr}$





40)  $y = 3x + 4$

41)  $m = 2$

42)  $x = -7$

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

44) 21

45) 3

46) 1

47)  $2\sqrt{2}$

48)  $3a^3b^3\sqrt{2a}$

49)  $6\sqrt{2}$

50)  $2\sqrt{10}$

51)  $\sqrt{34}$

52)  $10\sqrt{7}$

53) The dimensions of the garden are 10 feet by 14 feet.

54)  $t = \pm \frac{1}{2}$

55)  $x = \frac{5}{3}, x = -2$

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

57) The height of the sail is 21 feet.

58) Area =  $70 \text{ in}^2$ ; Perimeter = 40 in

59)  $m\angle 1 = 45^\circ, m\angle 3 = 45^\circ, m\angle 4 = 135^\circ$

60)  $m\angle A = 150^\circ$  and  $m\angle B = 30^\circ$

61) isosceles triangle,

$$m\angle 1 = 65^\circ$$

$$m\angle 2 = 115^\circ$$

$$m\angle 3 = 65^\circ$$

$$m\angle 4 = 50^\circ$$

$$m\angle 5 = 65^\circ$$

62)  $m\angle A = 80^\circ, m\angle B = 80^\circ$

63)  $m\angle A = 40^\circ, m\angle B = 35^\circ, m\angle C = 105^\circ$

64) a. false, b. true, c. true

65)  $\angle A \cong \angle M, \angle B \cong \angle O, \angle C \cong \angle P$  are congruent angles and

$$\frac{AB}{MO} = \frac{BC}{OP} = \frac{AC}{MP} \text{ are proportional sides}$$

66) 6

67) The tree is 120 feet tall.

68)

Polygon	Number of sides of polygon
hexagon	6
triangle	3
octagon	8
quadrilateral	4
pentagon	5

69) 20 diagonals

70)  $m\angle A = 110^\circ, m\angle B = 70^\circ, m\angle BCD = 110^\circ, m\angle D = 70^\circ$

71)  $x = 2$

72)  $CA = 6; BC = 2\sqrt{11}; AB = 17$

73) The ladder will reach 12 feet up the wall.

74)  $\{y \mid y > -150\}$

75)  $\left\{x \mid x \geq -\frac{8}{7}\right\}$

76) The  $m\angle 1 = 35^\circ$  since it is supplementary to  $145^\circ$ .  $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$  where  $\angle 2 \cong \angle 3$  because it's to be an isosceles triangle. Let  $a = m\angle 2 = m\angle 3$  then

$$35 + a + a = 180$$

$$2a = 145$$

$$a = 72.5$$

Since  $\angle x$  and  $\angle 2$  are alternate interior angles, therefore congruent, then  $x = 72.5^\circ$

77) Since  $ABCD$  is a parallelogram, consecutive angles, ( $\angle BAD$  and  $\angle CDA$ ) are supplementary, thus  $m\angle BAC + m\angle CAD + m\angle CDA = 180^\circ$ . Let  $x = m\angle CAD$  then  $25 + x + 110 = 180$ , so  $m\angle CAD = 45^\circ$ .

78) Since  $ABCD$  is a parallelogram,  $\overline{AB} \parallel \overline{CD}$ .  $\overline{AC}$  would be a transversal intersecting the parallel lines.  $\angle ACD$  and  $\angle CAB$  are alternate interior angles and are congruent. Since  $m\angle BAC = 25^\circ$  then  $m\angle ACD = 25^\circ$

79)  $C = 10\pi$  cm and  $A = 25\pi$  cm<sup>2</sup>

80)  $\frac{4}{x}$

81)  $x = 2$  RESTRICTIONS:  $x \neq -5, 0$