MA 110 COLLEGE ALGEBRA
PRACTICE TEST ONE
Sctns: 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3.

1- 4. Solve for each linear equation. [1.1]

1. $7y - 3 + 2y = 7y - 8$

2. $\frac{-5}{3}x + 3 = 23 - \frac{1}{4}x$

3. $20 = 8 - 5(2x - 3) + 4x$

4. $\frac{1}{3}x + \frac{1}{4}x + \frac{1}{5}x = \frac{47}{60}$

5- 6. Solve the following formula for the indicated variable. [1.1]

5) $A = P(1 + r\,t)$ for r

6a) $V = \frac{1}{3}\pi h^2(3r - h)$ solve for r.

6b) Electricity The formula

$$i := \frac{V}{R}\left(1 - e^{\left(\frac{R\,t}{L}\right)}\right)$$

occurs in the theory of electricity. Solve for t.

7) Finance. Two investments are made totaling $50,000. In one year the first investment yields a profit of 10%, whereas the second yields a profit of 12%. Total profit for this year is $5250. Find the amount initially put into each investment. [1.1]

8- 9. Solve the inequalities, then write the solution set in set notation, number line notation, and interval notation. [1.2]

8. $\frac{-3}{2}x < -6$

9. $\frac{1}{2} > \frac{-1}{6} - \frac{-2}{9}x$

Solve the compound inequalities and graph the solution set. [1.2]

10) $\frac{2}{5}x + \frac{x}{10} < -2$ or $x - 3 > 2$

Solve by completing the square

11) $2x^2 - 5x + 4 = 0$

Solve using the quadratic formula.

12) $3x^2 + 2 = 6x$

13) A triangle has its vertices at (-4, 5), (4,-1), and (0, 8). Find the perimeter of the triangle and determine whether or not it is a right triangle.

 14 - 21. Solve each equation and check your solutions by substitution. [1.3]

14. $\sqrt{2x+4} = \sqrt{1-x}$

15. $\sqrt[4]{5x-8} = \sqrt[4]{4x-1}$

16. $-15 = \dfrac{\sqrt{2x+5}}{-3} - 12$

17. $\sqrt{3x+1} - 4 = 1$

18. $x + 1 = \sqrt{5x+1}$

19. $\sqrt{x-5} + \sqrt{4x} - 8 = 0$

20. $x^{2/3} - 9x^{1/3} + 8 = 0$

21. $\left(x^2 - x\right)^2 - 18\left(x^2 - x\right) + 72 = 0$

Simplify the following and write your answer in $a + bi$ form. [1.4]

22 a) (3-2*i*) + (5 +6*i*)

b) (25 +*12i*) – (6+2*i*)

c) (2 +3*i*) (5-3*i*)

d) $\frac{2-i}{5+2i}$

e) $(2-i)(4+3i)$

f) $(-2+7\imath)(4+9\imath)$

g) i^{49}

Write the complex number in the standard form $a+bi$. [1.4]

23. $\frac{25+\sqrt{-18}}{3}$

24- 29. Solve the following using factoring, SQR property of equality, or the quadratic formula. [1.5]

24. $25x^2+16=40x$

25. $4x^2=\frac{1}{4}$

26. $(x-2)^2=9$

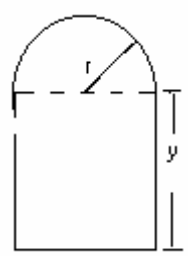
27. $-2x^2+5x=11$

28. $81x^2-49=0$

29. $9x^2+12x+4=0$

30. **Dimensions of a Window** The area of a rectangular window is to be 306 square centimeters. If the length exceeds the width by 1 centimeter, what are the dimensions? [1. 5]

31. A church window has the shape of a rectangle surmounted by a semicircle, as shown in the figure.



Express the area A of the window as a function of the radius r of the semicircle if the perimeter of the window is 30ft. [1. 5]

32. Projectile Motion. A stone thrown downward with an initial velocity of 34.3m/sec will travel a distance of s meters, where

$$s(t) := 4.9\,t^2 + 34.3\,t$$

and t is in seconds. If a stone is thrown downward at 34.4m/sec from a height of 294m, how long will it take the stone to hit the ground? [1. 5]

33. Find the equation of the line perpendicular to $2x - 4y = 5$
that has an x- intercept of -2. [2.3]

Graph the line and give x- and y- intercept [2.3]
34. $y = -3/2\,x + 1$

35-39. Compute the slope, the midpoints and the distance of the given segments. [2.1]
35. (-2.2, 2) , (3,2)
36. (3,2), (1,-2)
37. (-2,2), (1,-2)
38. (x1,y1), (m, n)
39. (-0.2, 0.3), (2.3, 1.1)

40 – 42. For each of the following relations, give the domain and range and indicate which are also functions. [2. 2]

40. {(-1, 3), (1, 3), (2, -5)}
41. {(4, 3), (3, -1), (7, 4)}

42.

x	y
-3	9
-2	4
0	0
1	1
-3	8

43. Complete the table for the values given to find ordered pair solutions for the related equation. [2. 2]

$x + 1 = y^2$

x	y
___	-1, 1
15	___

44. Given that h (x) = $|x^2 + 1|$ evaluate the following. [2. 2]

h(- 1.5)
h(2/3)
h(3y)

45. Find the equation of a line that satisfies the given conditions. Write the equation in slope-intercept form. [2. 3]

a) m = -2/3; passing through (1, -1).
b) x-intercept = (2,0); y-intercept = (0,-1).
c) m = -3; y-intercept = (0, 3).

46) Find an equation of the line that contains the point (1,-2) and is perpendicular to the line x +3y = 6.
Graph the two lines. [2.3]

47) Trolley tracks are laid with expansion gaps between the steel rails so that the rails can expand without distortion. As the temperature increases, the width of the gap between the rails decreases linearly. Suppose the gap is 2.5 mm wide when the temperature is 51^oF and 1.2mm wide when the temperature is 83^oF. [2.3]

a) Express the width W of the expansion gap as a function of the temperature T.
b) What is the approximate width of the expansion gap when the temperature is 35^{o}F?

Answers:

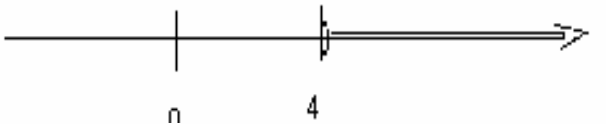
1) y =-2.5

2) -240/17 3) x =1/2 4) x = 1

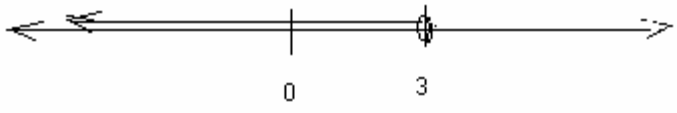
5) r = (A - P)/(Pt); 6a) r =(1/3)((3v/Π h^2)+h)

6b) $t := -\frac{L}{R}\left(\ln\left(1-\frac{iR}{V}\right)\right)$

7) $37,500 in the first (10%) investment; $12,500 in the second (12%) investment.

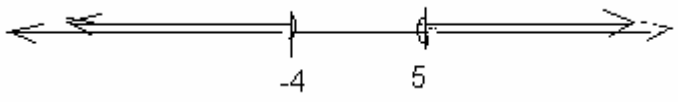
8) $\{x|x>4\}$ 

$x\varepsilon(4,\infty)$

9) $\{x|x<3\}$ 

$x\varepsilon(-\infty,3)$

10) $\{x|x<-4 or x>5\}$



$x\varepsilon(-\infty,-4)\cup(5,\infty)$;

11) $x=\frac{5}{4}\pm\frac{i\sqrt{7}}{4}$ 12) $x=1\pm\frac{\sqrt{3}}{3}$ 13) $p=15+\sqrt{97}$ units;
No, it is not a right triangle. 14) x = -1 15) x = 7

16) x = 38**; 17) x = 8; 18) x = 0, x =3; 19) x = 9; 20) x =1; 21) x = -3, x = -2, x =3,**

x = 4 22) a) 8 +4i; b) 19 +10i; c) 19 + 9i; d) $\frac{8}{29}-\frac{9}{29}i$ **; e) 11 +2i; f) -71 +10i; g) 0 +i**

23) $\frac{25}{3}+i\sqrt{2}$ **24) x =4/5; 25) x = 1/4, x = -1/4; 26) x = -1, x =5; 27) No solution**

28) x =7/9; x= -7/9; 29) x = -2/3

30 Width is 17cm and length is 18cm.

31) A (r) = $30r - 2r^2 - (\Pi r^2)/2$ 32) Ans: 5 secs 33) $y = -2x - 4$; 34) (2/3,0); (0,1)

35) m = 0; (0.5, 2); d = 5.2 36) m = 2; (2, 0); d = $2\sqrt{5}$ 37) m = -4/3; (-1/2, 0); d = 5

38) m = $\left(\frac{n-y_1}{m-x_1}\right)$; $\left(\frac{x_1+m}{2},\frac{y_1+n}{2}\right)$ d = $\sqrt{m^2-2mx+x^2+n^2-2ny+y^2}$,

39) m = 0.32 ; (1.05, 0.7) ; d = 2.625

40. D = { -1, 1, 2}; R = { 3,-5}; fctn

41. D = {4,3,7}; R = {3,-1,4}; fctn

42.

x	y
-3	9
-2	4
0	0
1	1
-3	8

D = {-3, -2,0, 1 }; R = { 9,4,0,1,8};
This relation is not a function

$x + 1 = y^2$

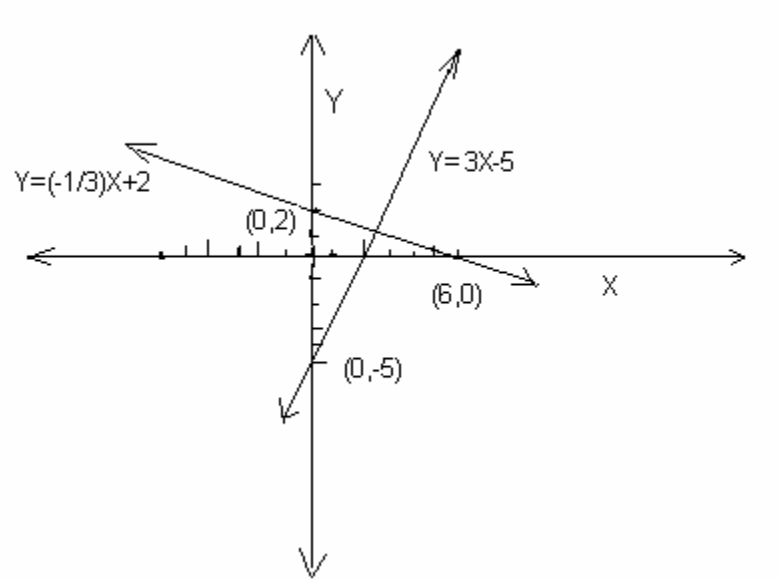
x	y
0	-1, 1
15	-4, 4

43.

44 a) h(- 1.5) = 3.25; b) h(2/3) = 1.4444; c) $h(3y) = 9y^2 + 1$

45 *a*) $y = \frac{-2x-1}{3}$ b) $\frac{x-2}{2}$ c) y = -3x+3

46) y = 3x-5 is perpendicular to y = (-1/3)x +2;



47) W = - 0**.** 040625T +4**.**572; Approximately 3.15mm