

1. Determine graphically the number of solutions to the equation:  $2x^4 + 3x^3 - 2x^2 = 4x - 2$ .

1. \_\_\_\_\_

For #2-5, solve graphically. Round solutions to the nearest hundredth.

2.  $\sqrt{x^3 + 2} = 4 + \sqrt{x + 5}$

2. \_\_\_\_\_

3.  $|x^3 - 3x + 3| = 4$

3. \_\_\_\_\_

4.  $\sqrt{x^3 + 2x^2 - x + 8} = 0$

4. \_\_\_\_\_

5.  $\frac{x^3 - 4x + 1}{x^2 + x - 6} = 0$

5. \_\_\_\_\_

6.  $x^4 + 10x^3 + 21x^2 \leq 40x + 80$   
(Use **interval notation** in your answer.)

6. \_\_\_\_\_

7.  $8 - |7 - 5x| > 3$

7. \_\_\_\_\_

Use **interval notation** in your answer.

For #8-13, (a) determine the system of equations necessary to solve the following problems, and (b) answer the question(s).

8. The sum of two numbers is 25, and the sum of their squares is 325. Find the two numbers.

8a. \_\_\_\_\_

8b. \_\_\_\_\_

9. A radiator contains 10 quarts of fluid, 30% of which is antifreeze. How much fluid should be drained and replaced with pure 100% antifreeze so that the new mixture 40% antifreeze?

9a. \_\_\_\_\_

9b. \_\_\_\_\_

10. A builder is planning to put grass all around a flower bed that measures 26ft by 42 ft. He has 400ft<sup>2</sup> of grass to use. How wide should the grass be?

10a. \_\_\_\_\_

10b. \_\_\_\_\_

11. A total of \$4000 is invested in stock at an interest rate of 12% per year and in a savings account that pays 4% per year. How much should be invested in each account to obtain a return of 9% per year on the total investment?

11a. \_\_\_\_\_

11b. \_\_\_\_\_

12. A toy rocket is fired straight up from ground level with an initial velocity of 80 ft/sec. When will the rocket reach a height of 64 feet off the ground?

12a. \_\_\_\_\_

b. \_\_\_\_\_

Use:  $h = -16t^2 + v_0t + h_0$ , where  $h$  is the height of the object, and  $v_0$  and  $h_0$  are the rocket's initial velocity and initial height, respectively.

13. When will the above rocket hit the ground?

13a. \_\_\_\_\_

b. \_\_\_\_\_

14. Cindy has cashews that sell for \$3.50 a pound and peanuts that sell for \$2 a pound. How much of each must she mix to obtain 60 pounds of a mixture that she can sell for \$3 per pound?

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

b. \_\_\_\_\_

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Names: \_\_\_\_\_

1. Determine graphically the number of solutions to the equation:  $2x^4 + 3x^3 - 2x^2 = 4x - 2$ .

+1 1. 2

For #2-5, solve graphically. Round solutions to the nearest hundredth.

2.  $\sqrt{x^3 + 2} = 4 + \sqrt{x + 5}$

+1 2. 3.58

$\sqrt{x^3 + 2} - 4 - \sqrt{x + 5}$

3.  $|x^3 - 3x + 3| = 4$

+4 3. -2.43, -1.53, 1.88, 3.35

$|x^3 - 3x + 3| - 4$

4.  $\sqrt{x^3 + 2x^2 - x + 8} = 0$

+1 4. -3.13

5.  $\frac{x^3 - 4x + 1}{x^2 + x - 6} = 0$

+3 5. -2.11, .25, 1.86

6.  $x^4 + 10x^3 + 21x^2 \leq 40x + 80$

+3 6. [-1.53, 1.89]

(Use interval notation in your answer.)

$x^4 + 10x^3 + 21x^2 - 40x - 80 \leq 0$

7.  $8 - |7 - 5x| > 3$

+3 7. (.4, 2.4)

Use interval notation in your answer.

$8 - |7 - 5x| - 3 > 0$

For #8-13, (a) determine the system of equations necessary to solve the following problems, and (b) answer the question(s).

8. The sum of two numbers is 25, and the sum of their squares is 325. Find the two numbers.

+4 8a.  $\begin{cases} x + y = 25 \\ x^2 + y^2 = 325 \end{cases}$

$y = (25 - x)$

8b. 10 and 15

9. A radiator contains 10 quarts of fluid, 30% of which is antifreeze. How much fluid should be drained and replaced with pure 100% antifreeze so that the new mixture 40% antifreeze?

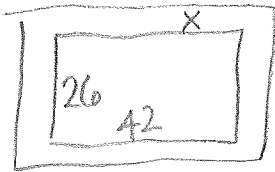
+4 9a.  $\begin{cases} x + y = 10 \\ .30x + 1.00y = 10(.40) \end{cases}$

9b.  $\frac{60\% \text{ of } 30\%}{8.57} \quad \frac{10\% \text{ of } 100\%}{1.43}$

$$\begin{array}{r} -3(x + y = 10) \\ 3x + 10y = 40 \\ \hline -3x - 3y = -30 \\ 3x + 10y = 40 \\ \hline 7y = 10 \\ y = \end{array}$$

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10. A builder is planning to put grass all around a flower bed that measures 26ft by 42 ft. He has 400ft<sup>2</sup> of grass to use. How wide should the grass be?



$$(26+2x)(42+2x) - (42 \cdot 26) - 400 = 0$$

11. A total of \$4000 is invested in stock at an interest rate of 12% per year and in a savings account that pays 4% per year. How much should be invested in each account to obtain a return of 9% per year on the total investment?

$$\begin{aligned} x + y &= 4000 \\ .12x + .04y &= 360 \end{aligned}$$

$$\begin{aligned} -4(x + y &= 4000) \\ 12x + 4y &= 36000 \end{aligned}$$

$$\begin{aligned} -4x - 4y &= -16000 \\ 12x + 4y &= 36000 \\ \hline 8x &= 20000 \end{aligned}$$

$(.09)(4000) = 360$

12. A toy rocket is fired straight up from ground level with an initial velocity of 80 ft/sec. When will the rocket reach a height of 64 feet off the ground? Use:  $h = -16t^2 + v_0t + h_0$ , where  $h$  is the height of the object, and  $v_0$  and  $h_0$  are the rocket's initial velocity and initial height, respectively.

13. When will the above rocket hit the ground?

$$-16t(t-5) = 0$$

14. Cindy has cashews that sell for \$3.50 a pound and peanuts that sell for \$2 a pound. How much of each must she mix to obtain 60 pounds of a mixture that she can sell for \$3 per pound?

$$\begin{aligned} 2(c + p &= 60) \\ 3.50c + 2p &= 180 \end{aligned}$$

$$\begin{aligned} -2c - 2p &= -120 \\ 3.50c + 2p &= 180 \\ \hline 1.5c &= 60 \\ c &= 40 \end{aligned}$$

10a.  $\frac{(26+2x)(42+2x) - (26 \cdot 42) = 400}{2.72 \text{ ft}}$

10b. 2.72 ft

11a.  $x + y = 4000$   
 $.12x + .04y = .09(4000)$

11b. \$2500 12%  
\$1500 4%

12a.  $64 = -16t^2 + 80t + 0$

b. 1 sec 4 sec

13a.  $0 = -16t^2 + 80t + 0$

b. 0 and 5 sec

14a.  $c + p = 60$   
 $3.50c + 2p = 180$

b. 40 lbs of cashews  
20 lbs of peanuts