

Trimester A Exam - Review Problems

- 1) Jill and Asanji each improved their yards by planting rose bushes and shrubs. They bought their supplies from the same store. Jill spent \$88 on 4 rose bushes and 12 shrubs. Asanji spent \$44 on 8 rose bushes and 2 shrubs. Find the cost of one rose bush and the cost of one shrub.

$x = \text{rose cost}$
 $y = \text{shrub cost}$

$$\begin{array}{r} 4x + 12y = 88 \xrightarrow{\times(-2)} -8x - 24y = -176 \\ 8x + 2y = 44 \rightarrow 8x + 2y = 44 \\ \hline -22y = -132 \end{array}$$

$8x + 12y = 44$
 $8x = 32$
 $x = 4$
 = rose cost
 $y = 6 = \text{shrub cost}$

- 2) Nicole's school is selling tickets to a play. On the first day of ticket sales the school sold 14 senior citizen tickets and 12 child tickets for a total of \$280. The school took in \$119 on the second day by selling 5 senior citizen tickets and 7 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

$x = \text{senior cost}$
 $y = \text{child cost}$

$$\begin{array}{r} 14x + 12y = 280 \xrightarrow{\times(-5)} -70x - 60y = -1400 \\ 5x + 7y = 119 \xrightarrow{\times(14)} 70x + 98y = 1666 \\ \hline 38y = 266 \\ y = 7 \\ x = 14 \end{array}$$

Solve each equation.

3) $|5a| = 30$
 $5a = 30$ $5a = -30$
 $a = 6$ $a = -6$

4) $9|8a| = 72$
 $18a = 8$
 $8a = 8$ $8a = -8$
 $a = 1$ $a = -1$

State how the graph compares to the parent graph. ($y = |x|$)

5) $y = 3|x| + 2$
 2 up, Steeper

6) $y = 3|x - 3| + 3$
 Steeper, Right 3, Up 3

7) $y = 3|x| - 4$
 Steeper, Down 4

8) $y = -3|x| + 2$
 Steeper, Reflected, Up 2

Solve each inequality and graph its solution.

9) $|9n + 9| + 2 < 83$

$|9n + 9| < 81$
 $9n + 9 < 81$ AND $9n + 9 > -81$
 $9n < 72$ AND $9n > -90$
 $n < 8$ $n > -10$

10) $-8 + |r| \geq 1$

$|r| \geq 9$
 $r \geq 9$ OR $r \leq -9$

Solve each equation by factoring.

11) $a^2 = 4 + 3a$

$$a^2 - 3a - 4 = 0$$

$$(a-4)(a+1) = 0$$

$$a = 4, a = -1$$

12) $a^2 = -6 + 7a$

$$a^2 - 7a + 6 = 0$$

$$(a-6)(a-1) = 0$$

$$a = 6, a = 1$$

13) $7x^2 - 21x = 70$

$$7x^2 - 21x - 70 = 0$$

$$7(x^2 - 3x - 10) = 0$$

$$7(x-5)(x+2) = 0$$

$$x = 5, x = -2$$

14) $n^2 - 32 = -4n$

$$n^2 + 4n - 32 = 0$$

$$(n+8)(n-4) = 0$$

$$n = -8, n = 4$$

Solve each system using matrices.

15) $-x - 4y = -3$
 $2x - 5y - 3z = -26$
 $-3x - 5y - z = 3$

$$(-5, 2, 2)$$

16) $-2x + y - 4z = 13$
 $-5y - z = -22$
 $-6x + 4y - 4z = 20$

$$(2, 5, -3)$$

Solve each equation with the quadratic formula.

17) $3k^2 - 11k - 18 = 0$

$$\frac{11 \pm \sqrt{(-11)^2 - 4(3)(-18)}}{2(3)} = \frac{11 \pm \sqrt{121 + 216}}{6}$$

$$= \frac{11 \pm \sqrt{337}}{6}$$

18) $6m^2 - 9m - 22 = 0$

$$\frac{9 \pm \sqrt{(-9)^2 - 4(6)(-22)}}{2(6)} = \frac{9 \pm \sqrt{81 + 528}}{12}$$

$$= \frac{9 \pm \sqrt{609}}{12}$$

Solve each equation by taking square roots.

19) $9x^2 = 36$

$$x^2 = 4$$

$$x = \pm\sqrt{4}$$

$$x = \pm 2$$

20) $n^2 + 1 = 25$

$$n^2 = 24$$

$$n = \pm\sqrt{24}$$

$$n = \pm\sqrt{4}\sqrt{6} = \pm 2\sqrt{6}$$

Factor each and find all roots. One root has been given.

21) $x^4 - x^3 - 22x^2 + 40x = 0; 2$

$$2 \left| \begin{array}{cccccc} 1 & -1 & -22 & 40 & 0 & \\ & 2 & 2 & -40 & 0 & \\ \hline 1 & 1 & -20 & 0 & 0 & \end{array} \right.$$

$$x^3 + x^2 - 20x = 0$$

$$x(x^2 + x - 20) = 0$$

$$\rightarrow x(x+5)(x-4)$$

$$x = 0, -5, 4$$

22) $x^4 + 4x^3 - 25x^2 - 100x = 0; 5$

$$5 \left| \begin{array}{cccccc} 1 & 4 & -25 & -100 & 0 & \\ & 5 & 45 & 100 & 0 & \\ \hline 1 & 9 & 20 & -0 & 0 & \end{array} \right.$$

$$x^3 + 9x^2 + 20x = 0$$

$$x(x^2 + 9x + 20) = 0$$

$$x(x+4)(x+5) = 0$$

$$x = 0, -4, -5$$

Simplify each expression.

$$\begin{aligned} 23) (2m^4 - 7 - 4m^3) + (2m^4 - 8 - 6m^3) \\ 2m^4 - 7 - 4m^3 + 2m^4 - 8 - 6m^3 \\ 4m^4 - 10m^3 - 15 \end{aligned}$$

$$\begin{aligned} 24) (5 - 6n^4 + 6n^2) - (4 - 4n^2 - 2n^4) \\ 5 - 6n^4 + 6n^2 - 4 + 4n^2 + 2n^4 \\ -4n^4 + 10n^2 + 1 \end{aligned}$$

Find each product.

$$\begin{aligned} 25) (3x + 3)(x - 8) \\ 3x^2 - 24x + 3x - 24 \\ 3x^2 - 21x - 24 \end{aligned}$$

$$\begin{aligned} 26) (8p + 1)(6p - 8) \\ 48p^2 - 64p + 6p - 8 \\ 48p^2 - 58p - 8 \end{aligned}$$

$$\begin{aligned} 27) (x - 4)(8x^2 - 8x - 8) \\ 8x^3 - 8x^2 - 8x - 32x^2 + 32x + 32 \\ 8x^3 - 40x^2 + 24x + 32 \end{aligned}$$

$$\begin{aligned} 28) (7m + 7)(4m^2 + 4m - 7) \\ 28m^3 + 28m^2 - 49m + 28m^2 + 28m - 49 \\ 28m^3 + 56m^2 - 21m - 49 \end{aligned}$$

Solve each equation by completing the square.

$$\begin{aligned} 29) p^2 - 4p - 60 = 0 \\ p^2 - 4p = 60 \\ p^2 - 4p + 4 = 60 + 4 \\ (p - 2)^2 = 64 \\ p - 2 = \pm 8 \quad p = \begin{matrix} 8 + 2 = 10 \\ -8 + 2 = -6 \end{matrix} \end{aligned}$$

$$\begin{aligned} 30) x^2 + 16x + 48 = 0 \\ x^2 + 16x = -48 \\ x^2 + 16x + 64 = -48 + 64 \\ (x + 8)^2 = 16 \\ x + 8 = \pm 4 \\ x = \begin{matrix} 4 - 8 = -4 \\ -4 - 8 = -12 \end{matrix} \end{aligned}$$

$$\begin{aligned} 31) p^2 + 2p - 8 = 0 \\ p^2 + 2p = 8 \\ p^2 + 2p + 1 = 8 + 1 \\ (p + 1)^2 = 9 \\ p + 1 = \pm 3 \\ p = \begin{matrix} 3 - 1 = 2 \\ -3 - 1 = -4 \end{matrix} \end{aligned}$$

$$\begin{aligned} 32) n^2 - 18n - 19 = 0 \\ n^2 - 18n = 19 \\ n^2 - 18n + 81 = 19 + 81 \\ (n - 9)^2 = 100 \\ n - 9 = \pm 10 \\ n = \begin{matrix} 10 + 9 = 19 \\ -10 + 9 = -1 \end{matrix} \end{aligned}$$

- 33) The height h (in feet) of a baseball t seconds after it is hit is given by this function: $h = -16t^2 + 96t + 3$.

Find the following:

- a.) The height from which the ball is hit.

3 feet (when $x=0$)

- b.) The maximum height that the ball reaches.

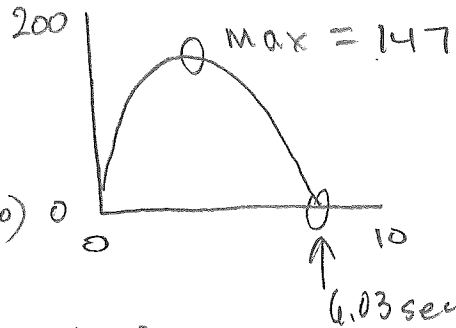
147 feet (max-y-value)

- c.) The time at which the ball reaches its maximum height.

3 seconds (max-x-value)

- d.) The time when the ball hits the ground.

6.03 sec (find the zero)



Write an equation of the line through the given points.

- 34) through: (4, 2) and (-2, 5)

$$m = \frac{5-2}{-2-4} = \frac{3}{-6} = -\frac{1}{2} \quad \text{OR } y = -\frac{1}{2}x + 4$$

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

- 35) through: (0, 2) and (-1, -3)

$$m = \frac{-3-2}{-1-0} = \frac{-5}{-1} = 5$$

$$y - 2 = 5x \quad \text{OR } y = 5x + 2$$

- 36) through: (5, 1) and (2, 3)

$$m = \frac{3-1}{2-5} = \frac{2}{-3} = -\frac{2}{3} \quad y - 1 = -\frac{2}{3}(x - 5)$$

$$\text{OR } y = -\frac{2}{3}x + \frac{13}{3}$$

- 37) through: (-2, -5) and (5, 3)

$$m = \frac{3-(-5)}{5-(-2)} = \frac{8}{7}$$

$$y + 5 = \frac{8}{7}(x + 2)$$

$$\text{OR } y = \frac{8}{7}x - \frac{19}{7}$$

Write the equation of the line described.

- 38) through: (-4, 5), parallel to $y = -\frac{3}{2}x + 2$

$$y - 5 = -\frac{3}{2}(x + 4)$$

- 39) through: (-5, 4), parallel to $y = -\frac{7}{5}x + 5$

$$y - 4 = -\frac{7}{5}(x + 5)$$

- 40) through: (-2, -5), perp. to $y = -\frac{2}{5}x$

$$m = \frac{5}{2}$$

$$y + 5 = \frac{5}{2}(x + 2)$$

- 41) through: (-5, -3), perp. to $y = \frac{5}{2}x$ $m = -\frac{2}{5}$

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