

Final Exam Sample Review Problem Set #2

INSTRUCTIONS: CLEARLY SHOW WORK. ROUND TO 2 DECIMALS UNLESS OTHERWISE TOLD.

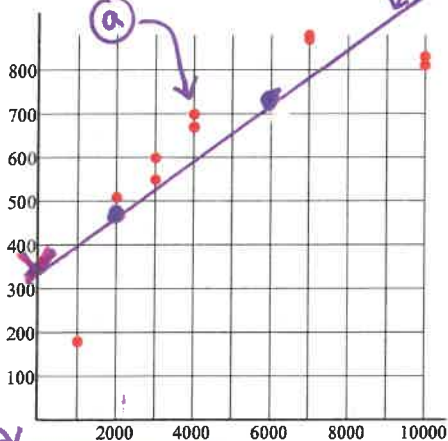
Fit the Best Fit Line

- a) Construct a scatter plot.
- b) State if there is a positive, negative, or no correlation.
- c) Use TIcalc to find the equation of the line that best fits the data (round 2 decimals)
- d) Plot the Best Fit Line on the scatterplot: Label the y-intercept(Y);
Label 2 points with their letters & ordered pairs - pt A:(2000, _) and pt B:(6000, _)

1)

X	Y	X	Y
1,000	180	4,000	700
2,000	510	7,000	870
3,000	550	7,000	880
3,000	600	10,000	810
4,000	670	10,000	830

© $\hat{y} = .06x + 378.92$



Positive correlation
 $y = 0.055113x + 378.92$

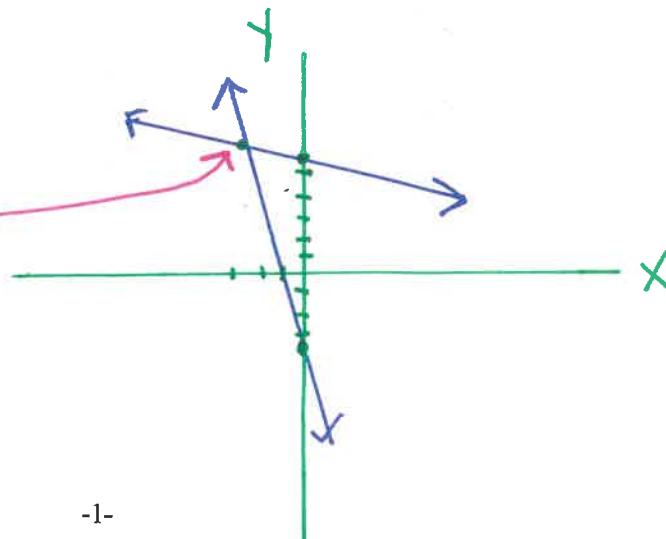
Solve the system by graphing using the TICALC.

- a) Sketch the graph
- b) Identify the solution on the graph and label.
- c) Check algebraically. Roundt checks to 3 decimals.

2) $y = -\frac{1}{4}x + \frac{11}{2}$
 $y = -\frac{11}{3}x - \frac{15}{4}$

(-2.71, 6.18)

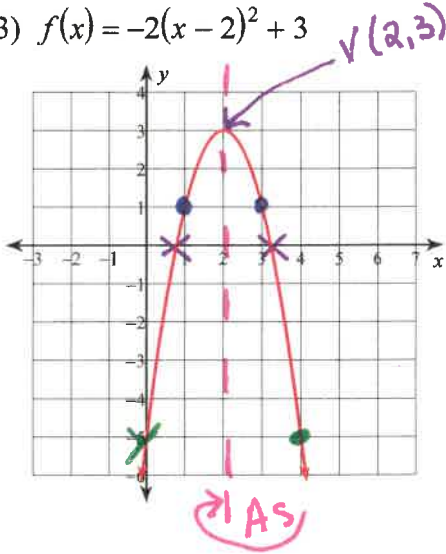
c: $6.18 = 6.178$
c: $6.18 = 6.187$



Graph and solve the quadratic function:

- (a) Clearly graph at least 5 points and provide the supporting table of values.
- (b) Give the ordered pair for the y-intercept: "Y-int (,)" If possible, mark graph with a "Y".
- (c) Mark the axis of symmetry with a "AS" and give the appropriate equation.
- (d) Mark the vertex with a "V" and give its ordered pair.
- (e) Mark the x-intercepts with a "X" and give the ordered pairs.
- (f) Solve the quadratic function and label solutions "Roots are x=..."

3) $f(x) = -2(x-2)^2 + 3$



(a)

x	0	1	2	3	4
y	-5	1	3	1	-5

(b) Y-INT (0, -5)

(c) AS $x=2$

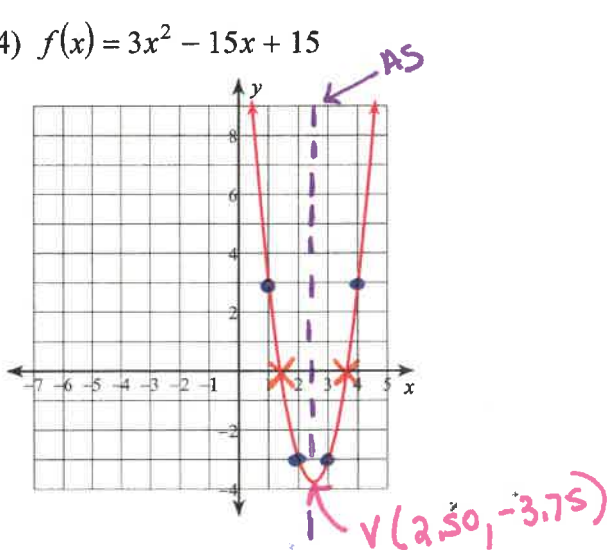
(d) X-INT'S (0.78, 0)
(3.22, 0)

(e) ROOTS $x = .78, 3.22$

Graph and solve each function. ROUND TO 2 DECIMALS.

- (a) Clearly graph marking at least 5 points and provide the supporting table of values.
- (b) Mark the axis of symmetry with a "AS". Provide the appropriate equation.
- (c) Mark the vertex with a "V". Provide the ordered pair.
- (d) Mark the x-intercepts with a "X" by estimating its location.
- (e) Solve the quadratic function by graphing, and label solutions "Roots are x=..."

4) $f(x) = 3x^2 - 15x + 15$



(a)

x	0	1	2	2.50	3	4	5
y	15	3	-3	-3.75	-3	3	15

(b) AS: $x=2.50$

(c) V: (2.50, -3.75)

(d) X-INT plotted on graphs

(e) Roots

$x = 1.38, 3.62$

Solve AND CHECK equation by taking square roots. CLEARLY SHOW WORK AND ROUND TO 2 DECIMALS.

$$5) \quad \begin{array}{r} -7 - 7x^2 = -336 \\ +7 \quad \quad +7 \end{array}$$

$$\begin{array}{r} -7x^2 = -329 \\ \hline -7 \quad \quad -7 \end{array}$$

$$\sqrt{x^2} = \sqrt{47}$$

$$x \approx \pm \sqrt{47}$$

$$x \approx \pm 6.86$$

$$C: -336.42 \approx -336 \checkmark$$

$$C: -336.42 \approx -336 \checkmark$$

Solve AND CHECK with the quadratic formula. CLEARLY SHOW WORK AND ROUND TO 2 DECIMALS.

$$6) \quad \begin{array}{r} 3x^2 - 11x - 12 = x \\ -x \quad \quad -x \end{array}$$

$$3x^2 - 12x - 12 = 0$$

$$x = \frac{12 \pm \sqrt{144 - 4(3)(-12)}}{2(3)}$$

$$x = \frac{12 \pm \sqrt{288}}{6}$$

$$x = \frac{12 + \sqrt{288}}{6}$$

$$x \approx 4.83$$

$$C: 486 \approx 4.83 \checkmark$$

$$x = \frac{12 - \sqrt{288}}{6}$$

$$x \approx -0.83$$

$$C: -.81 \approx -.83 \checkmark$$

Solve AND CHECK by completing the square. CLEARLY SHOW WORK AND ROUND TO 2 DECIMALS.

$$7) \quad n^2 - 14n - 2 = -4$$

$$\frac{n^2 - 14n + 49}{+2 \quad +2} = -2 + 49$$

$$\sqrt{(n-7)^2} = \sqrt{47}$$

$$\frac{n-7 = \pm \sqrt{47}}{+7 \quad +7}$$

$$n = 7 \pm \sqrt{47}$$

$$n = 7 + \sqrt{47}$$

$$n \approx 13.86$$

$$C: -3.94 \approx 4 \checkmark$$

$$n = 7 - \sqrt{47}$$

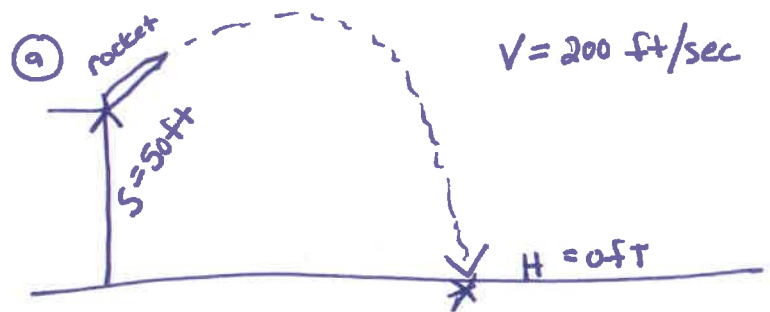
$$n \approx .14$$

$$C: -3.94 \approx 4 \checkmark$$

For the following word problems:

- Sketch and label the graph. Include units and label the variables.
- Write the model for height as a function of time using function notation.
- Use the quadratic formula to solve. Clearly show your work!!
Round solutions to "ONE DECIMAL". Circle your solutions.
- Answer question in a complete sentence.

- 8) A rocket is launched from a top a 50 ft cliff with an initial vertical velocity of 200 feet per second. how long after the rocket is launched will it hit the ground?



$$(b) \quad h(t) = -16t^2 + 200v + 50$$

9) complete on next page

$A = -16$ $B = 200$ $C = 50$

(c) $0 = -16T^2 + 200V + 50$

$h(t) \rightarrow t = \frac{-200 \pm \sqrt{40000 - 4(-16)(50)}}{2(-16)} = \frac{-200 \pm \sqrt{43200}}{-32}$

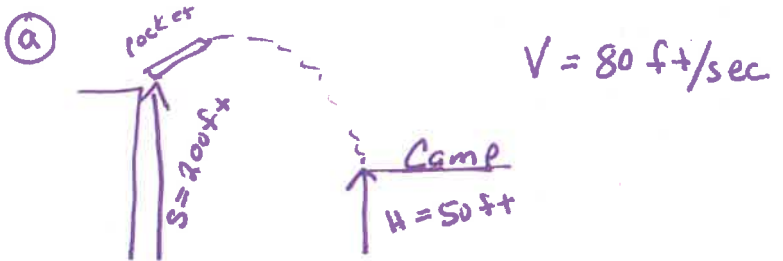
$t = \frac{-200 + \sqrt{43200}}{-32}$ $t = \frac{-200 - \sqrt{43200}}{-32}$

$t \approx -0.2$ $t \approx 12.7$

(d) It will take about 12.7 seconds for the rocket to hit the ground

For the following word problem, follow instructions from prior word problem:

10) A rocket is launched from a top a 200 ft cliff with an initial vertical velocity of 80 feet per second. How long after the rocket is launched will it hit the target camp that is 50ft above the ground?



(b) $h(t) = -16T^2 + 80T + 200$

(c) $50 = -16T^2 + 80T + 200$

-50 -50

$0 = -16T^2 + 80T + 150$

$A = -16$
 $B = 80$
 $C = 150$

$t = \frac{-80 \pm \sqrt{6400 - 4(-16)(150)}}{2(-16)}$

$t = \frac{-80 \pm \sqrt{16,000}}{-32}$

$t = \frac{-80 + \sqrt{16000}}{-32}$

$t = \frac{-80 - \sqrt{16000}}{-32}$

$t = -1.5$
 $t = -1.45$

$t = 6.5$
 $t = 6.45$

(d) The rocket will hit the camp at about 6.5 seconds.

Simplify each expression. Leave in factored form.

$$11) \frac{x^2 - 49}{7x - 49} \cdot \frac{35x - 14}{25x^2 - 10x}$$

$$\frac{\cancel{(x+7)}\cancel{(x-7)}}{\cancel{7}(x-7)} \cdot \frac{\cancel{7}(5x-2)}{5x\cancel{(5x-2)}}$$

$$\boxed{\frac{x+7}{5x}}$$

$$12) \frac{n^2 + 9n + 14}{10n + 70} \cdot \frac{8}{n^2 + 12n + 20}$$

$$\frac{\cancel{(n+2)}\cancel{(n+7)}}{\cancel{10}(n+7)} \cdot \frac{\cancel{8}^4}{\cancel{(n+10)}\cancel{(n+2)}}$$

$$\boxed{\frac{4}{5(n+10)}}$$

$$13) \frac{6p+30}{6p-54} \cdot \frac{p-9}{4}$$

$$\frac{\cancel{6}(p+5)}{\cancel{6}(p-9)} \cdot \frac{(p-9)}{4}$$

$$\boxed{\frac{p+5}{4}}$$

$$14) \frac{m-6}{2m-2} \cdot \frac{m^2 - 9m + 8}{10m - 60}$$

$$\frac{\cancel{(m-6)}}{2\cancel{(m-1)}} \cdot \frac{(m-8)(m-1)}{10\cancel{(m-6)}}$$

$$\boxed{\frac{m-8}{20}}$$

$$15) \frac{x^2 + 3x - 28}{x^2 + 9x + 14} \div \frac{x-4}{x-10}$$

$$\frac{\cancel{(x+7)}\cancel{(x-4)}}{\cancel{(x+2)}\cancel{(x+7)}} \cdot \frac{(x-10)}{\cancel{(x-4)}}$$

$$\boxed{\frac{x-10}{x+2}}$$

$$16) \frac{m^2 - 3m - 54}{m+3} \div \frac{m^2 + 5m - 6}{m-1}$$

$$\frac{(m-9)\cancel{(m+6)}}{(m+3)} \cdot \frac{\cancel{(m-1)}}{\cancel{(m+6)}\cancel{(m-1)}}$$

$$\boxed{\frac{m-9}{m+3}}$$

$$17) \frac{n+2}{2n^2-4n+2} + \frac{n-1}{2n^2-4n+2}$$

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

$$\frac{2n+1}{2(n-1)(n-1)}$$

OR $\frac{2n+1}{2n^2-4n+2}$

No Common Factors to Simplify

$$18) \frac{x-4}{x^2-2x-24} - \frac{x+4}{x^2-2x-24}$$

$$\frac{x-4-(x+4)}{(x-6)(x+4)}$$

$$\frac{-8}{(x-6)(x+4)}$$

OR $\frac{-8}{x^2-2x-24}$

$$19) \frac{2n}{n-1} + \frac{2}{n-3} \left(\frac{n-1}{n-1} \right)$$

$$\frac{2n(n-3) + 2(n-1)}{(n-1)(n-3)}$$

$$\frac{2n^2-6n+2n-2}{(n-1)(n-3)}$$

$$\frac{2n^2-4n-2}{(n-1)(n-3)}$$

OR

$$\frac{2(n^2-2n-1)}{(n-1)(n-3)}$$

Divide.

$$21) (18x^2 - 32) \div (6x - 8)$$

$$\begin{array}{r} 3x+4 \\ 6x-8 \overline{) 18x^2+0x-32} \\ \underline{+ (18x^2-24x)} \\ 24x-32 \\ \underline{-(24x-32)} \\ 0 \end{array}$$

Check

$$(6x-8)(3x+4) = 18x^2 + 24x - 24x - 32$$

Checked ✓

$$20) \frac{4}{3} - \frac{x+5}{x+2}$$

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

$$\frac{4x+8-3x-15}{3(x+2)}$$

$$\frac{x-7}{3(x+2)}$$

$$22) (10x^2 - 47x + 28) \div (10x - 7)$$

$$\begin{array}{r} x-4 \\ 10x-7 \overline{) 10x^2-47x+28} \\ \underline{+ (10x^2-7x)} \\ -40x+28 \\ \underline{-(-40x+28)} \\ 0 \end{array}$$

Check:

$$(10x-7)(x-4) = 10x^2 - 40x - 7x + 28$$

Checked ✓

Simplify each and state the excluded values.

23) $\frac{x^2 - 2x - 8}{x^2 - 8x + 16}$ $\frac{(x-4)(x+2)}{(x-4)(x-4)}$ Factor

Simplify:
Cancel
Common
Factors

EXCLUDED
VALUES BASED
ON FACTORS
IN DEN -

$x-4=0$
 $x \neq 4$

$\frac{x+2}{x-4}$

25) $\frac{k^2 + 6k + 8}{7k + 28}$ $\frac{(k+2)(k+4)}{7(k+4)}$ Factor

$k+4=0$
 $k \neq -4$

$\frac{k+2}{7}$

24) $\frac{6x^3 - 48x^2}{x^2 - 17x + 72}$ $\frac{6x^2(x-8)}{(x-9)(x-8)}$ Factor

$x-9=0$ $x-8=0$
 $x \neq 9$ $x \neq 8$
 $x \neq 8, 9$

$\frac{6x^2}{x-9}$

26) $\frac{r^2 + 3r + 2}{r^2 - 3r - 10}$ $\frac{(r+1)(r+2)}{(r-5)(r+2)}$ Factor

$r-5=0$ $r+2=0$
 $r \neq 5$ $r \neq -2$
 $r \neq -2, 5$

$\frac{r+1}{r-5}$

Solve AND CHECK each equation. Identify any extraneous solutions.

27) $\frac{3}{x} = \frac{3x^2 - 18x + 24}{x^2} - \frac{6}{x^2}$ $\times x^2$
mult by LCD

simplify + SET = 0

$3(x) = 3x^2 - 18x + 24 - 6$
 $-3x$

$0 = 3x^2 - 21x + 18$

olve + factoring

Factor $\rightarrow 0 = 3(x^2 - 7x + 6)$
 $0 = 3(x-6)(x-1)$

SET FACTORS = 0

$x-6=0$ $x-1=0$
 $x=6$ $x=1$

Check for extraneous solutions

$C: \frac{1}{2} = \frac{2}{3} - \frac{1}{6}$ $C: 3 = 9 - 6$
 $.5 = .5$ $3 = 3$

28) $\frac{1}{6n^2} = \frac{n+2}{6n} + \frac{1}{3n^2}$ $6n^2$ mult by LCD

$1 = n(n+2) + 2(1)$ \leftarrow put in STD FORM $Ax^2 + Bx + C = 0$

$1 = n^2 + 2n + 2$
 -1

$0 = n^2 + 2n + 1$ \leftarrow solve

$0 = (n+1)(n+1)$
 $n+1=0$
 $n=-1$

$C: \frac{1}{6} = \frac{1}{-6} + \frac{1}{3}$
 $\frac{1}{6} = \frac{1}{6}$ \leftarrow check

Solve AND CHECK each equation. Identify any extraneous solutions.

29) $\frac{b-9}{b-4} = \frac{6b+2}{b^2-2b-8} + \frac{10}{b^2-2b-8}$

LCM $(b-4)(b+2)$

$(b-4) \quad (b-4)(b+2) \quad (b-4)(b+2)$

simplify $(b+2)(b-9) = (6b+2) + 10$

$$b^2 - 7b - 18 = 6b + 12$$

$$\begin{array}{r} b^2 - 7b - 18 \\ -6b - 12 \\ \hline b^2 - 13b - 30 = 0 \end{array}$$

$$b^2 - 13b - 30 = 0$$

$$(b-15)(b+2) = 0$$

$$b-15=0$$

$$b=15$$

$$b+2=0$$

$$b=-2$$

C: $\frac{6}{11} = \frac{92}{187} + \frac{10}{187}$

$$\frac{6}{11} = \frac{102}{187}$$

C: $\frac{-11}{-6} = \frac{-10}{0} + \frac{10}{0}$

$$\frac{11}{6} = \text{UNDEFINED}$$

-2 is an EXTRANEUS SOLUTION

30) $\frac{r-1}{3} + \frac{r-1}{3r+15} = \frac{r+6}{3}$

LCM $3(r+5) = \text{LCD}$

$$(R-1)(R+5) + (R-1) = (R+6)(R+5)$$

$$R^2 + 4R - 5 + R - 1 = R^2 + 11R + 30$$

$$\begin{array}{r} R^2 + 4R - 5 + R - 1 \\ -R^2 - 11R - 30 \\ \hline -6R - 36 = 0 \end{array}$$

$$-6R - 36 = 0$$

$$-6(R+6) = 0$$

$$-6=0 \rightarrow R+6=0$$

$$R=-6$$

C: $\frac{-7}{3} + \frac{-7}{-3} = \frac{0}{3}$

$$0=0 \checkmark$$

31) $\frac{4}{x^2-x} + \frac{x+4}{x} = \frac{5}{x-1}$

LCM $x(x-1) = \text{LCD}$

$x(x-1) \quad x \quad x-1$

$$4 + (x+4)(x-1) = 5(x)$$

$$4 + x^2 + 3x - 4 = 5x$$

$$\begin{array}{r} x^2 + 3x = 5x \\ -5x \quad -5x \\ \hline x^2 - 2x = 0 \end{array}$$

$$x^2 - 2x = 0$$

$$x(x-2) = 0$$

Solve

$$x=0$$

$$x-2=0$$

$$x=2$$

Checks

$x=0$ C: $\frac{4}{0} + \frac{4}{0} = \frac{5}{-1}$

UNDEFINED $\neq -5$

$x=0$ is an extraneous solution

$x=2$ C: $\frac{4}{2} + \frac{6}{2} = \frac{5}{1}$

$$2 + 3 = 5$$

$$5=5 \checkmark$$