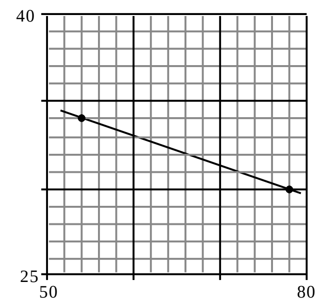
Mth 95 **Practice Exam** ***Franz Helfenstein*** **Name**

You must show the solution process not merely the answer to receive full credit. Write in a neat and organized fashion. Circle or box-in your answers. 100 pts.

1) Mathematics often requires finding the equation of a line from a graph. <u>**Outline a procedure**</u> for finding the equation of a line in slope-intercept form. 2) Then find the equation for the graph shown.



1) <u>Solution</u>

2)

3)

y =

4)

Solve each of the following equations <u>**algebraically**</u>. Show all steps and check your answers where possible. If you must solve a quadratic, you may use the QF program once you've obtained the standard form.

3) Solve for x:

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

4) Solve for p:

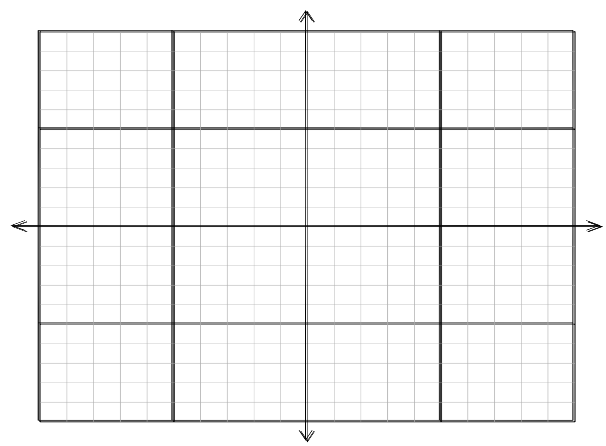
$$\frac{4p-3}{p} = \frac{9-p}{4} + \frac{11}{4}$$

5) Solve for w: $\dfrac{a - bw}{cw} = 1$

6) Solve for b: $ax^2 + b^2 = cb$

7) (a) Graph $Y_1 = \dfrac{x^3 - 36x}{9}$ and $Y_2 = \dfrac{1 - x^2}{20}$.

Sketch the result here in the <u>*standard window*</u>. Your graphs must <u>cross the perimeter in the correct location</u> and <u>show the roots correctly</u>.



(b) Find the intersection near the origin accurate to the hundredth's place.

(c) Find the root of Y_1 near x = 5.

(d) Find the local minimum in quadrant IV.

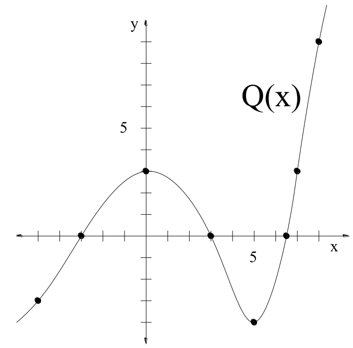
8) (a) Give the procedure for solving $0.05t^3 - 2t + 3 = -3.9 - 0.1t^2$ by graphical methods.

(b) Solve the problem and write the solution here accurate to the hundredth's place.

9) Give the following: a) $Q(-5) =$ b) $Q(7) =$

c) $Q(0) =$ d) $Q(x) = 9$, $x =$

e) $Q(x) = 3$, $x =$ f) All roots:



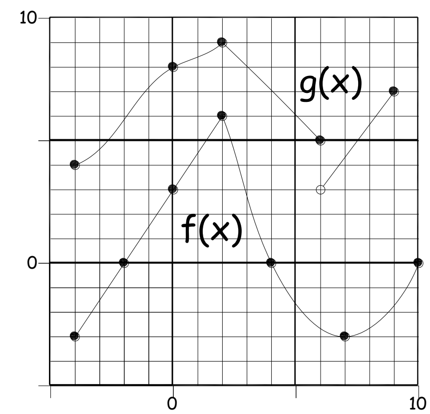
10) Answer the following questions based on the functions shown here.

(a) $f(7) =$ (b) $3f(-2) =$

(c) Give all "x" for which $f(x) = 0$

(d) What is the domain of $g(x)$?

(e) What does the graph of $f(t)$ look like?



11) For each function, give the independent variable and the dependent variable.

i) $F(r) = k\,e\,\frac{M \cdot m}{r^2}\,j$ ii) $H(t) = -(\frac{1}{2})gt^2 + v_0 t + h_0$ iii) $y(x) = f(x - x_0)$

indep: dep: indep: dep: indep: dep:

12) Rewrite as indicated

i) $F(r) = k\,e\,\frac{M \cdot m}{r^2}\,j$ ii) $H(t) = -16t^2 + 10t + 5$ iii) $y(x) = x^2$

$F(x) =$ $H(2) =$ $y(x + 1) =$

13) True/False Circle True if ALWAYS true. Otherwise circle False. (2 pts each)

T F $y = \frac{7}{ax^2 + bx + c}$ is a quadratic.

T F $2(x^3)^4 = 2x^{12}$

T F $(x^2)(x^5)(y^{-3}) = -x^7y^3$

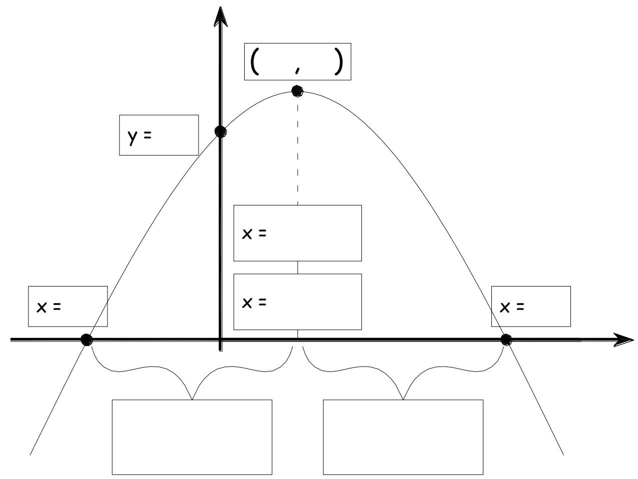
T F $(x^2 + 1)^2 = x^4 + 1$

T F If $f(42) = 37$ then the function's graph passes through (42, 37)

T F $y = a^2x + bx + c$ is a linear function

14) Graph $y_1 = \dfrac{2x^3 - 15x^2 - 323x + 1740}{30}$ and $y_2 = x^2 - 12x$ and adjust the viewing window to find an intersection in the first quadrant. Then list its coordinates.

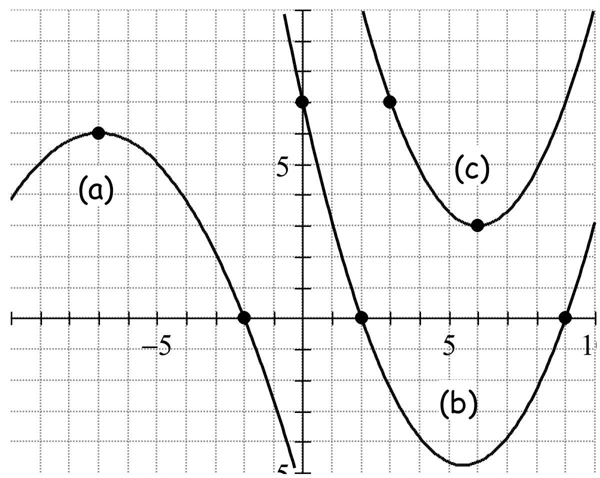
15) Fill in the boxes with expressions involving a, b, c, h, k, r_1, r_2.



16a) For $2gx^2 + Kx + \pi x - H = 0$ with indep. variable x,
List A, B, C

16b) For $2x^2 + vx - ax^2 + y^2 = 0$ with indep. variable x,
List A, B, C

17) Leave 'a' undetermined and write the equation of graph (a) in vertex form. Then use the given root to find 'a'. Write the parabola's equation.



Leave 'a' undetermined and write the equation of graph (b) in factored form. Then use the y-intercept to find 'a'. Write the parabola's equation.

Leave 'a' undetermined and write the equation of graph (c) in vertex form. Then use the extra point to find 'a'. Write the parabola's equation.

18) (a) $3x^2 y^3 5x^3 y^{-2} =$

(b) $a^2(a^5)^2 (b^{12})^3 =$

(c) $(a^3b^4)^2 (a^3b^2)^4 =$

(d) $\dfrac{(a^2b^3)^3 (ab^4)^2}{(a^4b^2)^2 (a^3b^2)^4} =$

Mth 95 **Practice Exam** ***Franz Helfenstein*** **Name** KEY

You must show the solution process not merely the answer to receive full credit. Write in a neat and organized fashion. Circle or box-in your answers. 100 pts.

1) Mathematics often requires finding the equation of a line from a graph. **Outline a procedure** for finding the equation of a line in slope-intercept form. 2) Then find the equation for the graph shown.

1) Find 2 pts (x_1, y_1) & (x_2, y_2)

2) Find slope $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

3) Use x, y & m in $y = mx + b$ to find b.

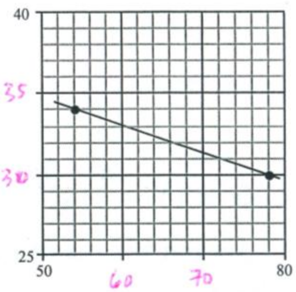
4) Write result $y = mx + b$

Solution

$(54, 34)$ $(78, 30)$

$m = -1/6$

$b = 43$



$y = \dfrac{-1}{6}x + 43$

Solve each of the following equations **algebraically**. Show all steps and check your answers where possible. If you must solve a quadratic, you may use the QF program once you've obtained the standard form.

3) Solve for x:

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

$$\frac{6}{1}\left[\frac{3+(-2x)}{2}\right] = 6[5] + \left[\frac{-6x+10}{3}\right]\frac{6}{1}$$

$$9 + -6x = 30 + (-12x) + 20$$

$$6x = 41$$

$$\boxed{x = 41/6}$$ ✓

4) Solve for p:

$$\frac{4p}{1}\left[\frac{4p-3}{p}\right] = \frac{4p}{1}\left[\frac{9-p}{4}\right] + \left[\frac{11}{4}\right]\frac{4p}{1}$$

LCD = 4p

$$4(4p-3) = p(9-p) + 11 \cdot p$$

$$16p - 12 = 9p - p^2 + 11p$$

$$p^2 - 4p - 12 = 0$$

Use QF or factor

$$(p-6)(p+2) = 0$$

$$\boxed{p = -2, 6}$$

5) Solve for w: $\frac{a - bw}{cw} = 1$

$a - bw = cw$

$a = bw + cw = (b+c)w$

$\boxed{w = \frac{a}{b+c}}$

6) Solve for b: $ax^2 + b^2 = cb$

$1b^2 - cb + ax^2$

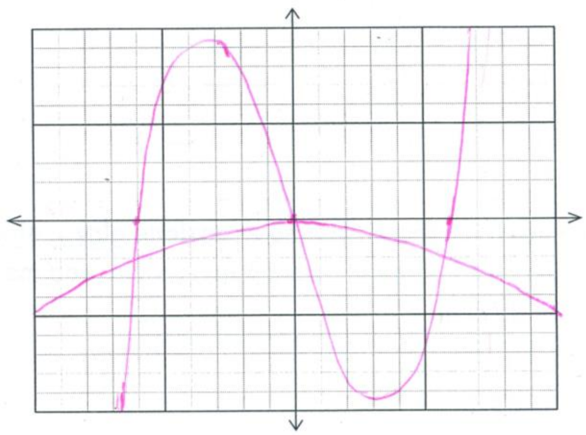
$A=1,\ B=-c,\ C=ax^2$

$\boxed{b = \frac{c \pm \sqrt{c^2 - 4ax^2}}{2}}$

7) (a) Graph $Y_1 = \frac{x^3 - 36x}{9}$ and $Y_2 = \frac{1 - x^2}{20}$.

Sketch the result here in the *standard window*.

Your graphs must cross the perimeter in the correct location and show the roots correctly.



(b) Find the intersection near the origin accurate to the hundredth's place.

$(-0.012, .05)$

(c) Find the root of Y_1 near $x = 5$.

$x = 6$

(d) Find the local minimum in quadrant IV.

$y = -9.24$

8) (a) Give the procedure for solving $0.05t^3 - 2t + 3 = -3.9 - 0.1t^2$ by graphical methods.

① enter into y_1 as f(x) ② enter into y_2 as g(x)
③ Graph in friendly window
④ Use 2nd Calc, Intersection. ⑤ x-value(s) are solutions

(b) Solve the problem and write the solution here accurate to the hundredth's place.

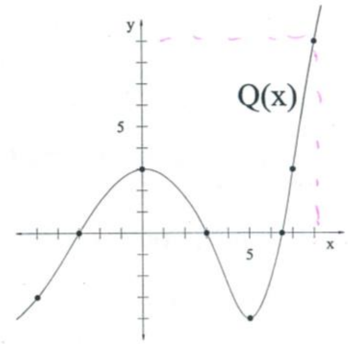
$t = -8.56$

9) Give the following: a) $Q(-5) =$ −4 b) $Q(7) =$ 3

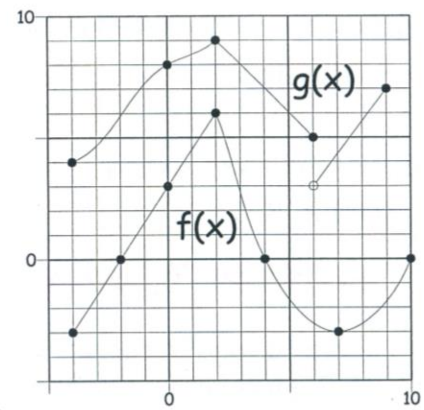
c) $Q(0) =$ 3 d) $Q(x) = 9$, $x =$ 8

e) $Q(x) = 3$, $x =$ 0, 7 f) All roots: $x = -2, 3, 6.5$

zeros, x-intercepts



10) Answer the following questions based on the functions shown here.



(a) $f(7) =$ −3

(b) $3f(-2) =$ $3 \cdot 0 = 0$

(c) Give all "x" for which $f(x) = 0$ $x = -2, 4, 10$

(d) What is the domain of $g(x)$? $-4 \le x \le 9$

(e) What does the graph of $f(t)$ look like?

The same as $f(x)$

dependent independent

11) For each function, give the independent variable and the dependent variable.

i) $F(r) = k\,e\,\dfrac{M \cdot m}{r^2}\,j$ ii) $H(t) = -(\tfrac{1}{2})gt^2 + v_0 t + h_0$ iii) $y(x) = f(x - x_0)$

indep:	dep:	indep:	dep:	indep:	dep:
r	F	t	H	x	y

12) Rewrite as indicated

i) $F(r) = k\,e\,\dfrac{M \cdot m}{r^2}\,j$ ii) $H(t) = -16t^2 + 10t + 5$ iii) $y(x) = x^2$

$F(x) = k e \dfrac{Mm}{x^2} j$ $H(2) = -16(2)^2 + 10 \cdot 2 + 5 = -39$ $y(x+1) = (x+1)^2$

13) True/False Circle True if ALWAYS true. Otherwise circle False. (2 pts each)

T F $y = \dfrac{7}{ax^2 + bx + c}$ is a quadratic.

T F $2(x^3)^4 = 2x^{12}$

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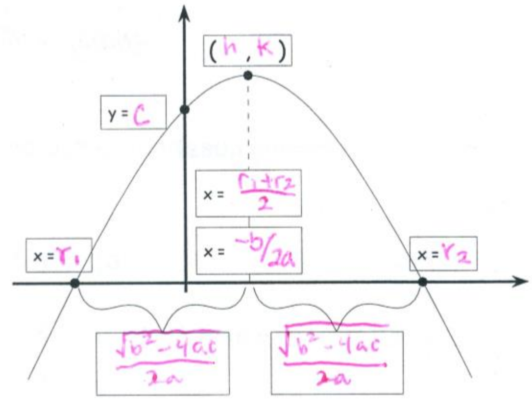
T F If $f(42) = 37$ then the function's graph passes through (42, 37)

T F $y = a^2x + bx + c$ is a linear function x & y to 1st power

14) Graph $y_1 = \dfrac{2x^3 - 15x^2 - 323x + 1740}{30}$ and $y_2 = x^2 - 12x$ and adjust the viewing window to find an intersection in the first quadrant. Then list its coordinates. $(19.17, 137.36)$

15) Fill in the boxes with expressions involving

a, b, c, h, k, r_1, r_2.

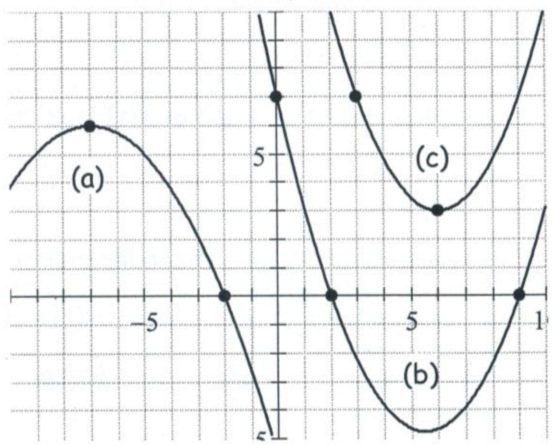


16a) For $2gx^2 + Kx + \pi x - H = 0$ w/ indep. variable x, List A, B, C $A = 2g$, $B = K+\pi$, $C = -H$

16b) For $2x^2 + vx - ax^2 + y^2 = 0$ w/ indep. variable x, List A, B, C

$A = 2-a$, $B = v$, $C = y^2$

17) Leave 'a' undetermined and write the equation of graph (a) in vertex form. Then use the given root to find 'a'. Write the parabola's equation.



$y = a(x+7)^2 + 6$

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

$a = -6/25$ $\quad y = \frac{-6}{25}(x+7)^2 + 6$

Leave 'a' undetermined and write the equation of graph (b) in factored form. Then use the y-intercept to find 'a'. Write the parabola's equation.

$y = a(x-2)(x-9)$ $\quad a = \frac{7}{18}$ $\quad y = \frac{7}{18}(x-2)(x-9)$

$7 = a(0-2)(0-9)$

$y = a(x-6)^2 + 3$

Leave 'a' undetermined and write the equation of graph (c) in vertex form. Then use the extra point to find 'a'. Write the parabola's equation.

$y = \frac{4}{9}(x-6)^2 + 3$

18) (a) $3x^2 y^3 5x^3 y^{-2} =$ $15x^5y$

(b) $a^2(a^5)^2 (b^{12})^3 =$ $a^{12} b^{36}$

(c) $(a^3b^4)^2 (a^3b^2)^4 =$ $a^{18} b^{16}$

(d) $\dfrac{(a^2b^3)^3 (ab^4)^2}{(a^4b^2)^2 (a^3b^2)^4} = \dfrac{a^6 b^9 a^2 b^8}{a^8 b^4 a^{12} b^8} = \dfrac{b^5}{a^{12}}$