

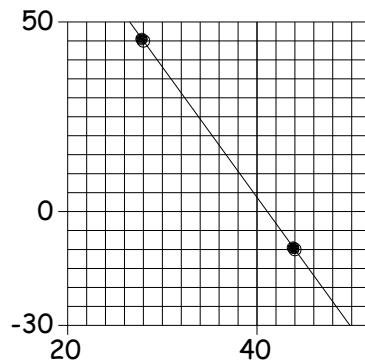
You must show the solution process not merely the answer to receive full credit. Write in a neat and organized fashion. **Circle or box-in** your answers. 100 pts.

Solving Equations You must show the solution process not merely the answer. Check your Answers!

1) Solve for x: $2 - 3 \cdot \frac{5 - 3x}{4} = \frac{3x}{5}$ 5 pts

2) Solve for x: $(x - 5)(x + 4) = 2(x - 5) + 18$ 5 pts

3) Use the indicated points to find the equation of this line in slope-intercept form. Show your work for full credit. 5 pts



4) For $f(x) = 1 + x^2$ compute and simplify the difference quotient. $\frac{f(x + h) - f(x)}{h}$ 5 pts

5) Use the graph to answer the following: 2 pts each

(a) $f(-2) =$ (b) $f(6) =$ (c) $g(f(2)) =$

(d) How many roots does $f(x)$ have and what are they?

(e) What is the domain of $f(x)$?

(f) Give all x -values for which $f(x) = 3$. $x =$

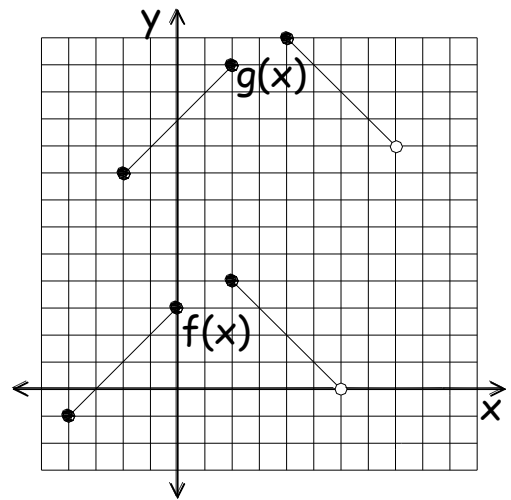
(g) Circle the correct version of $g(x)$ as a translated version of $f(x)$.

$g(x) = f(x + 2) + 9$

$g(x) = f(x - 2) + 9$

$g(x) = f(2x + 2) + 9$

$g(x) = f(4) + 9$



6) Find the average rate of change from $x_1 = 1$ to $x_2 = 4$ for the function $y = \frac{x^2 - 4}{2}$ 5 pts

7) $f(x) = \frac{4 - 5x}{3}$. Find $f^{-1}(x)$. 5 pts

8) Use the polynomial, $P(x) = 7x^2(x + 5)(x - 4)^3$ to answer the following. 4 pts

(a) What is the order of $P(x)$? _____ (b) What are the roots for $P(x)$? _____

9) An alien object is growing exponentially. When first discovered, it had a mass of 200# but now, 7 days later, it has a mass of 2500#. What is its exponential growth rate? Use $P = P_0e^{rt}$.

10) Give the domain of each of these functions:

2 pts ea

(a) $y = \frac{e^x}{(x-1)(x+1)}$

(b) $y = \frac{\ln(x-1)}{x}$

11) 2 pts ea

a) Combine factors and convert to all positive exponents

b) Simplify to a single term

c) Simplify to a single integer.

$\frac{(x^3 y)^3 x^{-8}}{x^4 y^5} =$

$\ln 2x^2 - 2\ln x =$

$\log_2 100 - \log_2 25 =$

12) $f(x) = 3x^2 - 1$ $g(x) = \sqrt{2x - 1}$ Simplify the following:

3 pts each

(a) $[g(x)]^{-1} =$

(b) $f(g(2)) =$

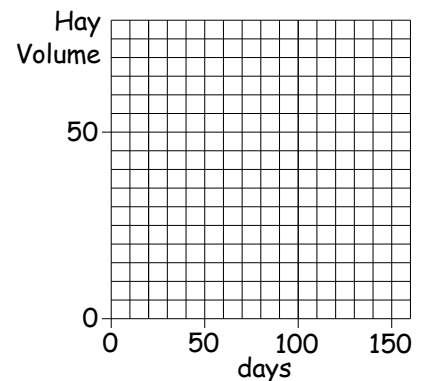
(c) $g^2(x) =$

13) $H(x) = 8xe^{-x/25}$ represents hay production in a field.
 $x = 0$ corresponds to beginning of irrigation. 2 pts each

(a) Draw the graph of $H(x)$.

(b) How many days after start of irrigation should the farmer harvest to obtain the maximum amount of hay?

(c) The farmer stops irrigating when $H(x)$ drops to 10. How many days is that? Round your answer to the nearest day.

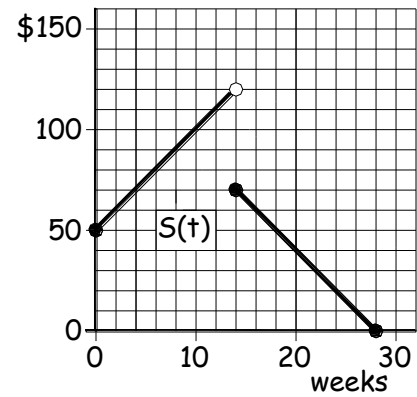


14) Using the TI graphing features, solve $e^{0.2x} = 12 + 5x$. Give answer to nearest hundredth

2 pts

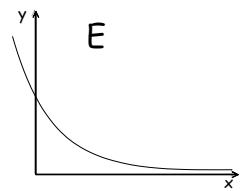
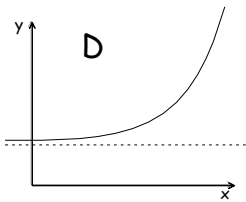
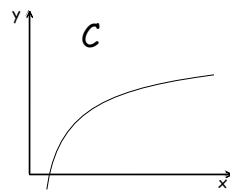
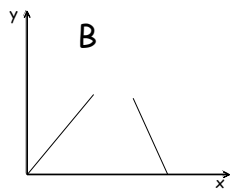
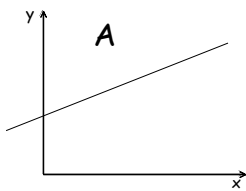
15) Write $S(t)$ as a piecewise function. Include domains. 4 pts

$$S(t) = \left\{ \begin{array}{l} \\ \\ \end{array} \right.$$



16) From this list, choose the letter that most closely associates with the graphs shown. Then write that letter on the graph. Not every letter will be used. Assume $a, b, c > 0$ 5 pts

(A) piecewise fcn	(B) quadratic fcn	(C) cubic fcn	(D) $y = \frac{a}{x-b}$	(E) $y = \ln(ax + b)$
(F) $y = (x - a)^5$	(G) $y = ae^{-x} + c$	(H) $ax - by + c = 0$	(I) $y = ae^{-bx}$	(J) $y = a(e^{bx}) + c$



17) Solve the following equations for y 3 pts each

(a) $x = 4 + e^{-2y}$

(b) $x = \ln(3y) + 5$

BONUS

The following data represents mercury concentration found in the sediment at the bottom of Lake Superior.

Sediment Depth (cm)	20	40	60	80
Concentration (ppb)	42	62	58	29

(a) Using the appropriate regression equation, what is the predicted worst pollution concentration and at what depth is it expected to be found?

(b) Using your regression equation, at what depth is contamination expected to be zero?