

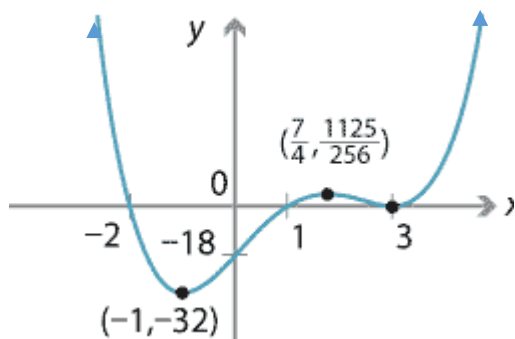
TURN OFF YOUR CELL PHONE AND PUT IN BAG. IF YOUR CELL PHONE IS SEEN, YOU WILL EARN A "0". SHOW ALL WORK CLEARLY FOR CREDIT. SCIENTIFIC CALCULATOR ONLY!!

[6] 1. Consider:  $f(x) = \sqrt{2x - 5}$

a) Determine of the domain of  $f(x)$   
Use interval notation.

b) Solve :  $f(x) = 4$  algebraically.

[12] 2. Use the graph to answer the questions:



- a) Give the interval(s) on which  $y=f(x)$  is increasing.
- b) Give the coordinates of the relative extrema or write none.

Relative min:                      Relative max:

- c) Give the domain (in interval notation)
- d) Give the range in interval notation.
- e) Give the zeros. For each zero, indicate if the multiplicity would be even or odd.
- f) Is the degree of this polynomial even or odd? Explain.

[7] 3. If  $g(x) = -x^2 + 6x$ , find:  $\frac{g(x+h) - g(x)}{h}$

[9] 4. Fill in the chart with EXACT values. Also include the radian measure.

	$x = 30^\circ$ or _____ radians	$x = 45^\circ$ or _____ radians	$x = 60^\circ$ or _____ radians
$\sin(x)$			
$\cos(x)$			
$\tan(x)$			

[21] 5. Solve each equation. Use exact values (**no calculators/decimals**)

a)  $2\cos^2\theta - \cos\theta - 1 = 0$  on the interval  $[0, 360^\circ)$

b)  $\sin(2\theta) = \frac{\sqrt{3}}{2}$  on the interval  $0 \leq \theta < 2\pi$

c) Find the general solution (all solutions) to  $\sin(x)\tan(x) = \sin(x)$ . Use radians.

[ 10] 6. Given  $g(x) = 2x^3 + x^2 - 8x - 4$

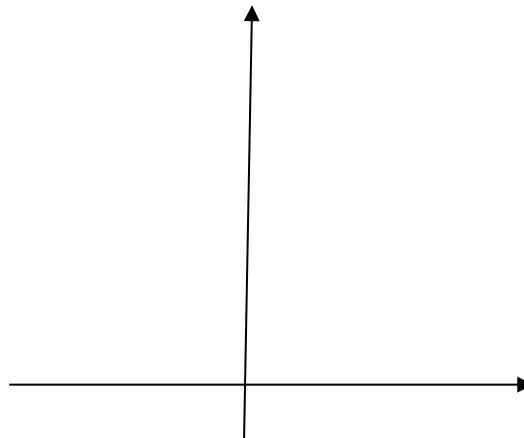
a) Give the y-intercept

b) Give the factored form

c) Zeros | Multiplicity | Tangent or cross through?

Zeros	Multiplicity	Tangent or cross through?

d) Draw the end behavior:



e) Graph using a-d. Label all intercepts!

[12] 7. Consider  $g(x) = \frac{2x+6}{x^2+x-6}$

a) State the domain of f(x) (any notation is fine)

d) Find the zero(s) or state none

b) Find the y-intercept or state none

e) Find the horizontal asymptote (or state none)

c) Find the vertical asymptote (or state none)

f) Find the x and y-coordinates any holes (or state none).

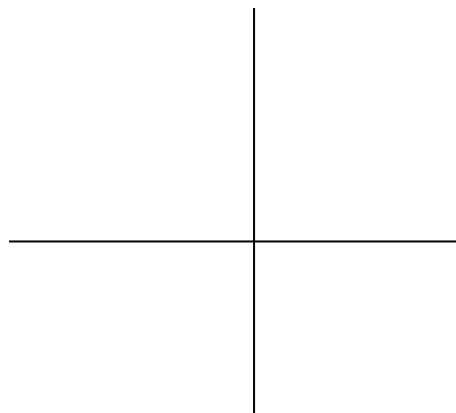
[10] 8. Graph. Fill in information, showing work algebraically. Label vertex, zeros and intercept on graph

$$y = x^2 + 6x - 7$$

Vertex:

Zeros:

y-intercept:



[8] 9. A class wants to enclose a rectangular garden using 75 feet of fence. The side of the school is used as one side of the rectangle (thus fencing is only needed on 3 sides). Draw a picture and label the sides with variables.

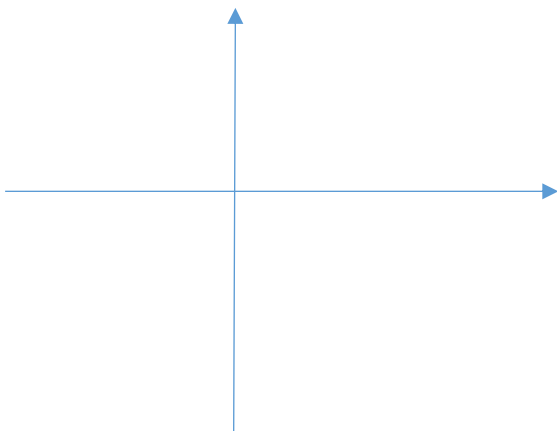
a) Find a function for the area of the garden in one variable.

b) What dimensions (length and width) yield maximum area? **Show your work algebraically** or no credit will be given. Put units on your answer.

[7] 10. Find the inverse. Show all work algebraically:  $g(x) = \frac{2x-1}{3x+5}$

[7] 11. Graph:  $f(x) = \begin{cases} 1, & x \leq -2 \\ -x^2, & -2 < x \leq 1 \\ x - 1, & x > 1 \end{cases}$

Mark endpoints open or closed.



[28] 12. Solve. Give exact answers and show work algebraically. **Do not use decimals.**

a)  $x^4 - 8x^2 - 9 \geq 0$ . Write solution in interval notation.

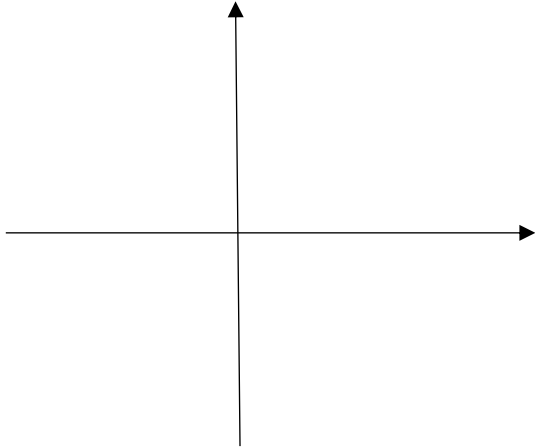
b)  $e^x - 14e^{-x} + 5 = 0$

c)  $12 \ln(5x + 1) = 4$

d)  $2 \left| \frac{1}{3}x - 4 \right| + 3 = 9$

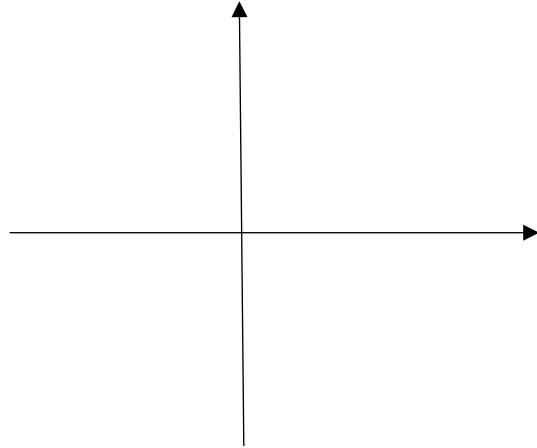
[12] 13. Graph each of the following. Label the indicated intercept and asymptote. Dash in Asymptote.

a)  $f(x) = \log_3(x - 3)$



x-int: \_\_\_\_\_ VA: \_\_\_\_\_

b)  $f(x) = e^{-x} + 2$



y-int: \_\_\_\_\_ HA: \_\_\_\_\_

[7] 14. Find the linear function  $f$  such that  $f(-1) = 5$  and  $f(2) = 7$

Final answer:  $f(x) =$  \_\_\_\_\_

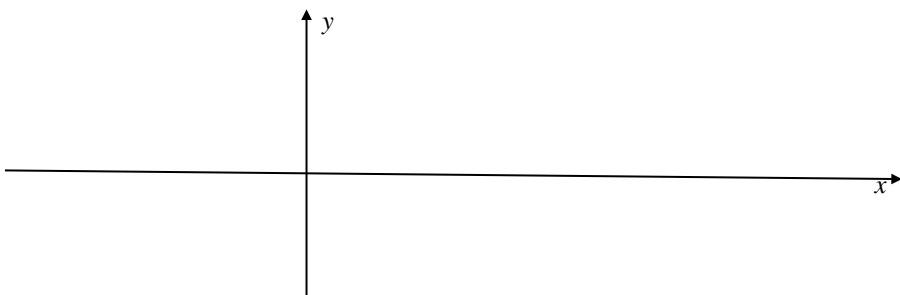
[9] 15. Suppose  $\sin(\theta) = -\frac{1}{4}$  where  $\theta$  is in Quadrant IV. Find the following. Give exact values (no decimals)

a)  $\cos \theta$

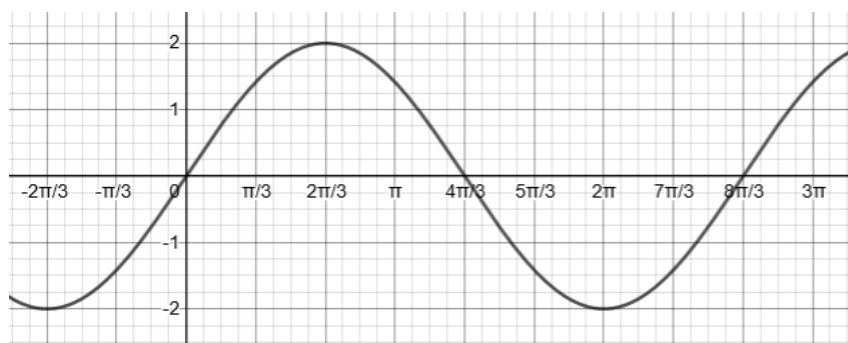
b)  $2 - 32\sin^2\theta$

c)  $\sin(2\theta)$

- [7] 16. Graph at least one period. **Clearly label** each graph pointing out  $x$ -intercepts and maximum and minimum points. Label at least 4 tick marks on  $x$ -axis and at least one tick mark on  $y$ -axis.  
 $y = -2\cos(4x)$



- [7] 17. Given the graph, find the following:



- a) domain:  
 b) Period:  
 c) Amplitude:  
 d) Equation of this function:

- [7] 18. From the top of a bridge, Maria looks down at a sailboat at an angle of depression of  $25^\circ$ . The bridge is 25m above the water. Calculate the horizontal distance from the bridge to the sailboat. Round to 2 decimal places and put units on your answer.

[14] 19. Prove **any 2** of the following 3. **Check the two boxes of the problems you want graded.** Put reasons next to each step. If you don't check two boxes, the first two will be graded, regardless of work.

a)  $\cos\left(\frac{\pi}{2} - \theta\right) = \sin\theta$

Grade?

b)  $\frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$

Grade?

c)  $\tan \alpha + \cot \alpha = \sec \alpha \csc \alpha$

Grade?