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!!

[9] 1. Use the graph of $y = f(x)$ to find the following:

a.) $\lim\limits_{x \to -2} f(x)$

b.) $\lim\limits_{x \to 0^+} f(x)$

c.) $\lim\limits_{x \to 2} f(x)$
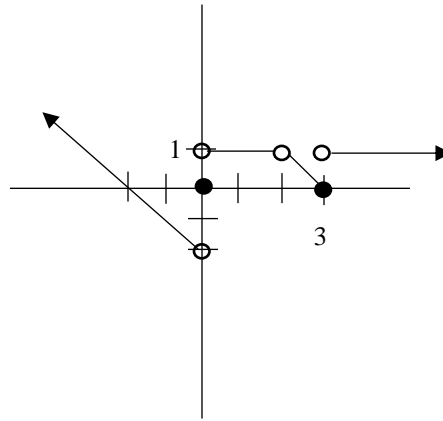
d.) $\lim\limits_{x \to 3^+} f(x)$

e.) $\lim\limits_{x \to 3^-} f(x)$

f.) $\lim\limits_{x \to 3} f(x)$

g.) $f(2)$

h.) $f(6)$

h.) $f(f(3))$

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

$(\frac{7}{4}, \frac{1125}{256})$

$(-1,-32)$
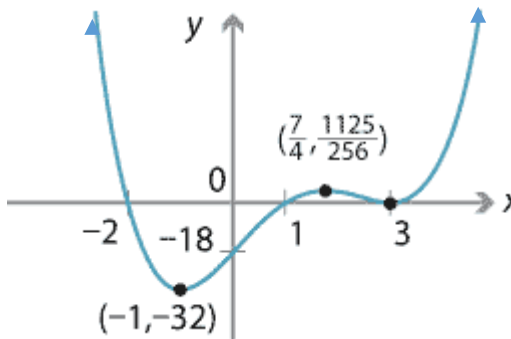
a) Give the interval(s) on which y=f(x) is decreasing.

b) Give the coordinates of the relative extrema or write none.

Relative maxima: Relative minima:

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.

[6] 3.   Fill in the chart with EXACT values. Also include the radian measure.

	x = 30^0 or _____ radians	x = 45^0 or _____ radians	x= 60^0 or _____ radians
sin(x)			
cos(x)			
tan(x)			

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

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

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

c) Find the general solution (all solutions) to $sin(2x) + sin(x) = 0$
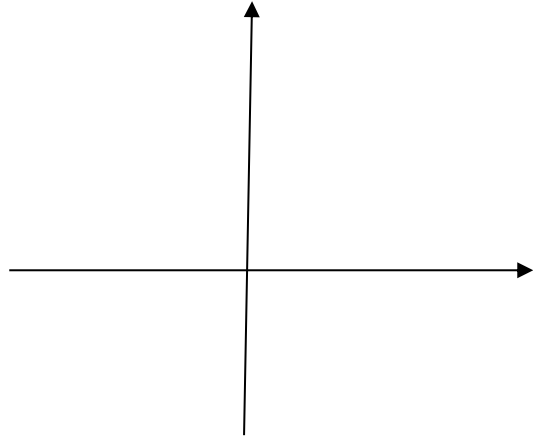
[10] 5.   Given $g(x) = 2x^3 + x^2 - 8x - 4$

   a) Give the y-intercept

   b)   Give the factored form

   c) Zeros| Multiplicity | Tangent or cross through?

   d)   Draw the end behavior: e) Graph. Label all intercepts!

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

   a) State the domain of f(x)   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).

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

[8] 8. A class wants to enclose a rectangular garden using 80 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] 9.   Find the inverse. Show all work algebraically: $g(x) = \dfrac{7x-1}{2x+3}$

[7] 10. Graph: $f(x) = \begin{cases} 2, & x \leq -2 \\ -x^2, & -2 < x \leq 1 \\ x+1, & x > 1 \end{cases}$ Mark endpoints open or closed.
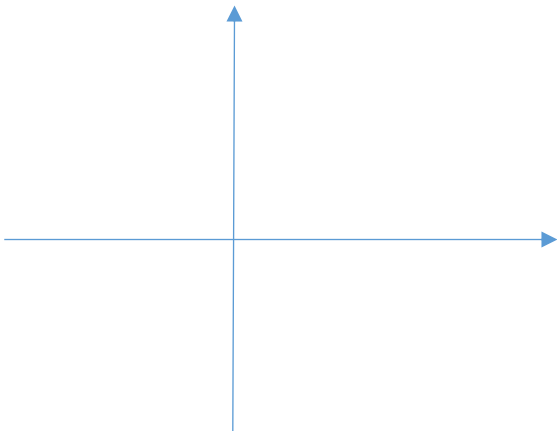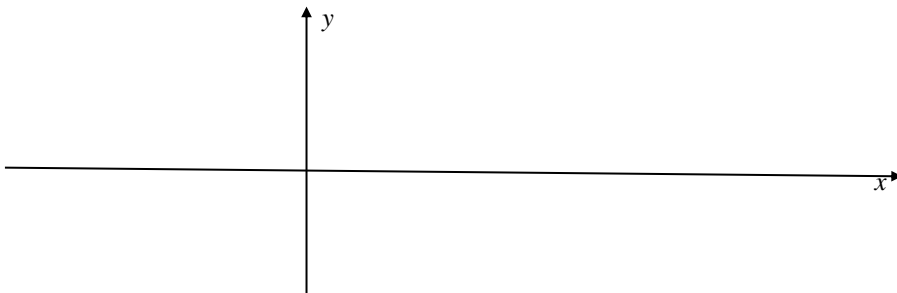
[9] 11. Suppose $\sin(\theta) = -\frac{1}{5}$ where θ is in Quadrant IV. Find the following. Give exact values (no decimals)

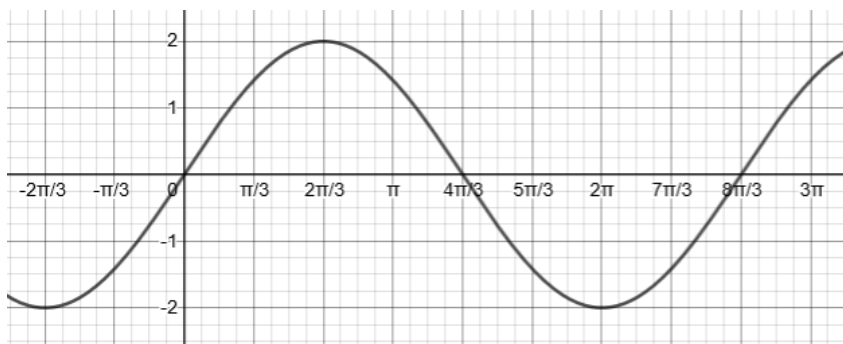   a) $\cos\theta$ b) $2 - 75\sin^2\theta$ c) $\sin(2\theta)$

[7] 12. 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] 13.   Given the graph, find the following:

a) domain:

b) Period:

c) Amplitude:

d) Equation of this function:

[7]   14.   From the top of a bridge, Maria looks down at a sailboat at an angle of depression of $25°$. The bridge is 20m 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] 15. 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) $\dfrac{\cos x}{1 - \sin x} = \dfrac{1 + \sin x}{\cos x}$

Grade?

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

Grade?

[28] 16.   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.
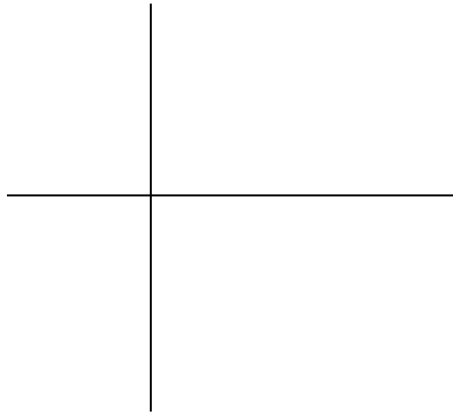
b) $e^x - 14e^{-x} - 5 = 0$

c) $6\ln(2x + 8) = 4$

d) $2\left|\frac{2}{3}x - 5\right| + 1 = 9$

[10] 17. Graph. Fill in information.

a) $y = x^2 - 6x - 7$
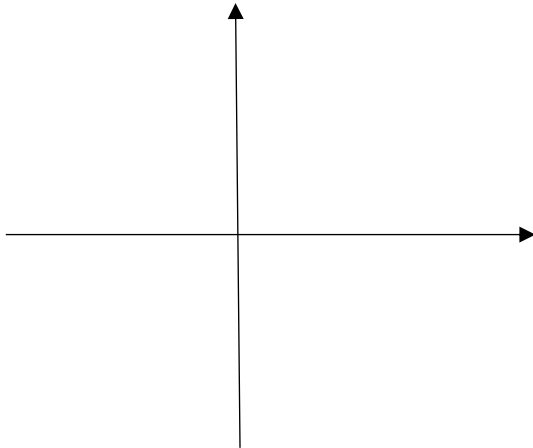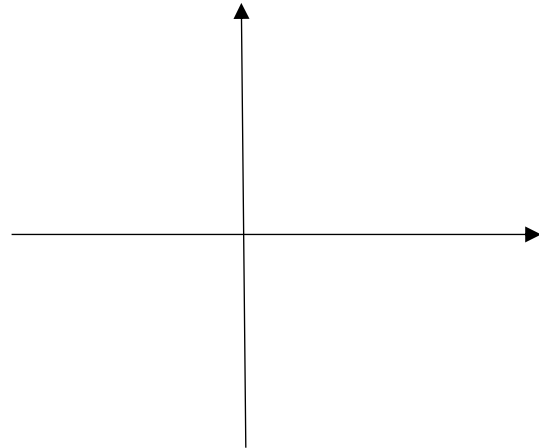Label vertex, zeros and intercept
on graph

Vertex:

Zeros:

y-intercept:

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

a) $f(x) = \log_3(x - 2)$

b) $f(x) = e^{-x} + 1$

x-int:_____   VA: _____   y-int: _____   HA: _____

[7] 19. Find the linear function f such that f(-1) = -2 and f(1) = 6.

Final answer: f(x) = _____