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!!

[10] 1. Find the domain (use interval notation)

a) $f(x) = \sqrt{x - 3}$ b) $g(x) = \cos(x)$

[12] 2. 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)			

[7] 3. Find **all** solutions (the general solution) to $\sin(2x) = \frac{1}{2}$.

[12] 4. Solve each equation on the interval $0 \le \theta < 2\pi$. Use exact values (no calculators/decimals)

a) $\cos(\theta) - \cos(\theta)\tan(\theta) = 0$ b) $\sin\theta - 2\sin\theta\cos\theta = 0$

[30]   5. Give exact answers and show work algebraically. **Do not use decimals**. 0 points for guess and check, you must use proper algebra.

a) $e^{2x} - e^x - 6 = 0$

b) $log_2(x + 2) = 3$

c) $\sqrt{4x + 5} = 3$

d) $2^{4x-1} = 8$

e) $\ln(2x + 5) = 2$

[12] 6. Suppose $\cos(\theta) = \frac{5}{13}$ where θ is in Quadrant I. Find the following. Give exact values (no decimals)

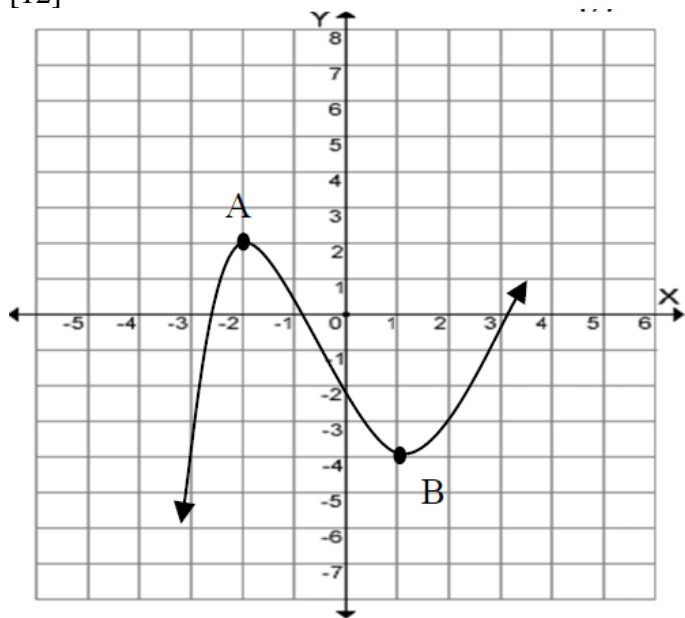a) $\sin \theta$ b) $\sin (2\theta)$ c) $-2sin^2\theta$

[5] 7.   Find the inverse of following function:

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

8. Use the graph of y=f(x) to answer the following:
[12]

a) Estimate the interval(s) on which f(x) is increasing

b) Give the coordinates (x,y) of the relative extrema A, B and classify as maximum or minimum

c) Is the leading coefficient of the polynomial f(x) negative or positive?

d) Is the degree of the polynomial of f(x) even or odd? Explain.

e) Give the domain in interval notation.

f) Give the range in interval notation.

[12] 9a. Graph at least one period. **Clearly label** each graph pointing out x-intercepts and maximum and minimum points. Label axes.

y= $2\cos(2x)$
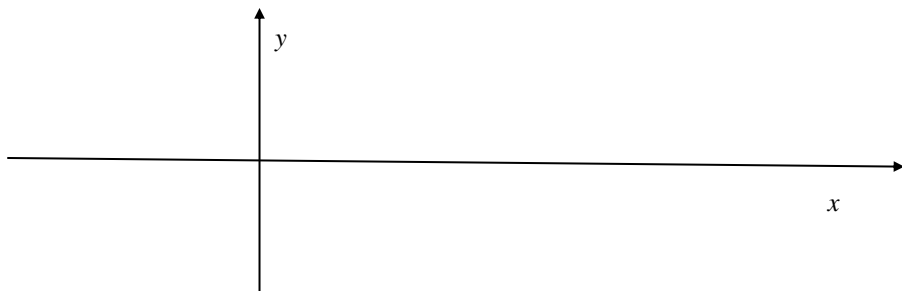
9b. Given $f(x) = -2\sin(2x + 3) - 5$ state the information:

a) Period: b) amplitude: c) Phase shift:

[10]   10. Find all solutions in simplified form, both real and complex imaginary.

a) $x^4 - 16 = 0$

b) $x^2 - 4x + 6 = 0$

[12] 11. Consider $f(x) = \frac{3x-3}{x^2-1}$

    a) State the domain of f(x)   d) Find the zero(s)
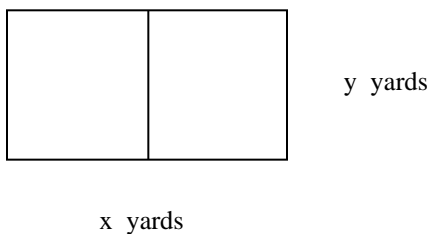
    b) Find the y-intercept   e) Find the horizontal asymptote (or state none)

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

[6] 12. Two rectangular corrals are enclosed with 60 yards of fence. Find the area of the corral in terms of y only.

y yards

x yards

[6]   13. From the top of a vertical cliff 40 m high, the angle of depression of an object that is level with the base of the cliff is 24º. How far is the object from the base of the cliff to the nearest tenth of a meter?
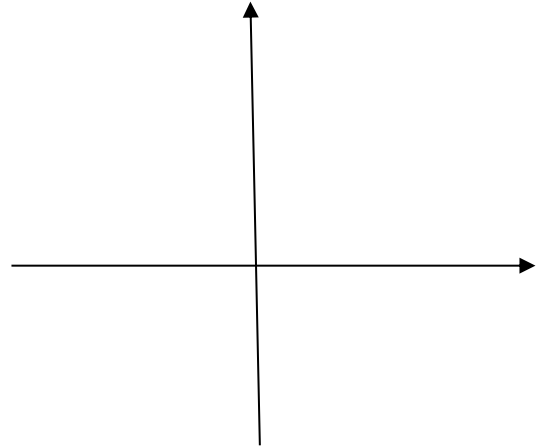
[10] 14.   Graph $f(x) = -x^4 - x^3 + 6x^2$

   a)   Give the y-intercept   b) give factored form

   c) Zeros | Multiplicity | Tangent or cross through?

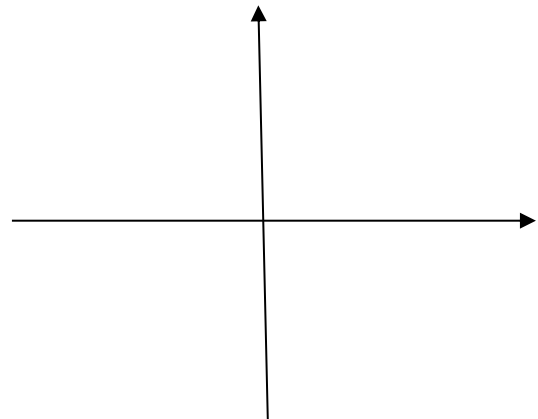   d) Draw the end behavior: e) Graph. Label all intercepts!
                                                          You don't need to label y-axis.

[6] 15.   Graph the following. Mark the endpoints as opened or closed.

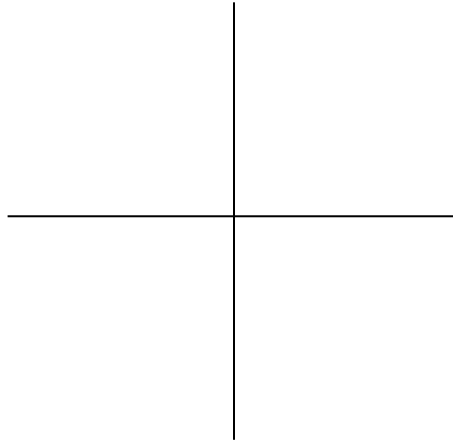$$f(x) = \begin{cases} 3, & x \geq 2 \\ x - 1, & x < 2 \end{cases}$$

[6] 16. If $f(x) = 2 - x^2$, $find$:

$\dfrac{f(x+h) - f(x)}{h}$

[18] 17. Graph. **DASH** in asymptotes where appropriate. Fill in information.

a) $y = x^2 - 8x + 15$

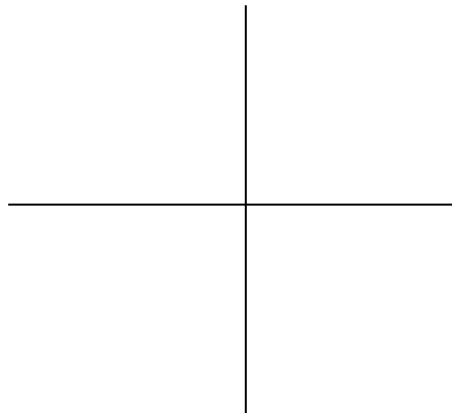Label vertex, zeros, and intercept on graph
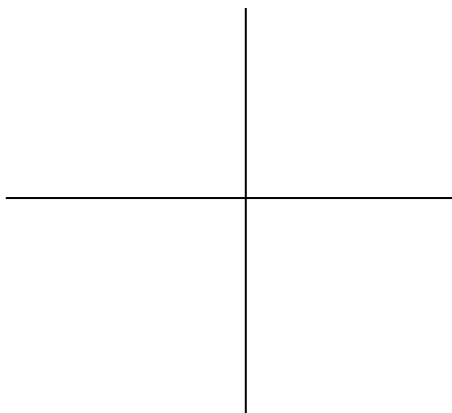
Vertex:

Zeros:

y-intercept:

b) $f(x) = \ln(x - 1)$

Equation of asymptote:

x-intercept:

c) $y = e^{-x} + 2$

Equation of asymptote:

y-intercept:

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

a) $cot^2 x - cos^2 x = cot^2 x \cdot cos^2 x$

Grade?

☐

b) $cos\left(\frac{\pi}{2} - x\right) = sin\, x$

Grade?

☐

c) $\dfrac{cos\, x}{1 - sin\, x} = \dfrac{1 + sin\, x}{cos\, x}$

Grade?

☐