

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.

1. Find the exact values of

a) $\sin \frac{4\pi}{3}$

[3]

b) $\cot \frac{5\pi}{4}$

[3]

c) $\tan\left(\arcsin \frac{2}{5}\right)$

[5]

[12] 2. Solve algebraically. Give exact answers (no decimals). No work = no credit.

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

b) $5 \ln(2x - 8) = 4$

[6]

c) $x^2 - 4x - 12 > 0$. Give solution in interval notation.

[12]3. Suppose $\sin \theta = \frac{2x}{3}$ for some acute angle θ . Express in terms of x .

a) $\cos \theta$

b) $\sin(2\theta)$

[12]4. Solve each equation on the interval $0 \leq \theta < 2\pi$.

a) $\cos \theta = -\frac{1}{2}$

b) $\sin(2\theta) = 0$

[7] 5. Find **all** solutions to $\cos(2\theta) = \frac{1}{2}$.

[12] 6a. Graph over one period.

Clearly label each graph pointing out x -intercepts and maximum and minimum points.

$$y = -3\sin(2x)$$



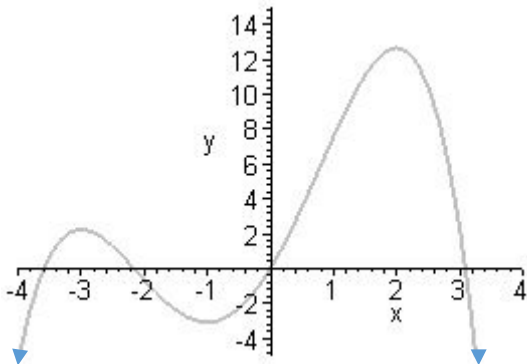
6b) Given $f(x) = 3\cos(4x - 3)$ state the information:

a) Period:

b) amplitude:

c) Phase shift.

7) Use the graph of $y=f(x)$ to answer the following: [9]



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

b) Give the coordinates of the relative maxima

c) Give the range in interval notation.

[8] 8. Factor completely

a) $x^4 - 7x^2 - 144$

b) $x^4 + 64x$

[14]9. Establish the identity:

$$\text{a) } \frac{1}{1 - \sin x} - \frac{1}{1 + \sin x} = \frac{2 \tan x}{\cos x}$$

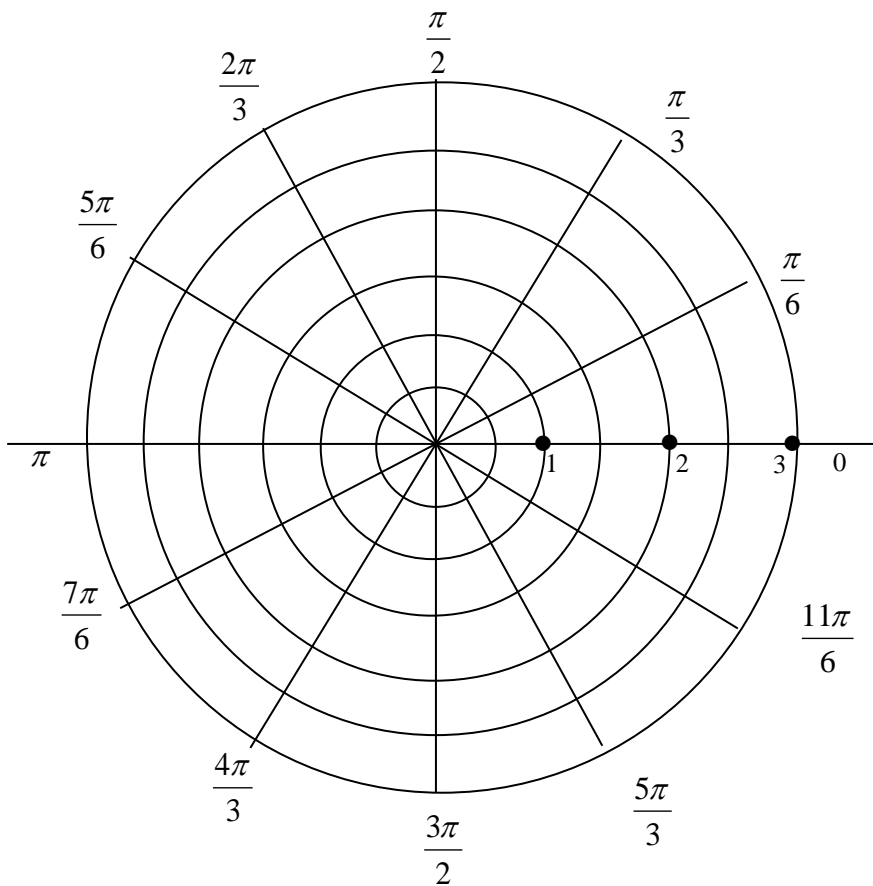
$$\text{b) } \frac{\cos^2 \theta}{1 + \sin \theta} = 1 - \sin \theta$$

[12] 10. Decompose into partial fractions and determine the coefficients.

$$\text{a) } \frac{-2x}{x^2 + 9x + 18}$$

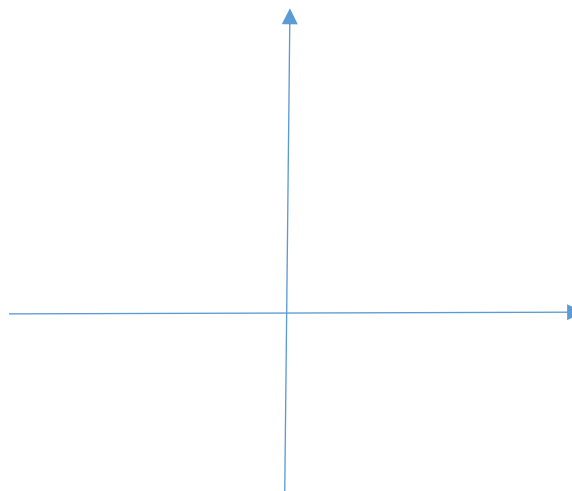
$$\text{b) } \frac{3x^2 + 10x - 1}{x^3 + x^2 - 2x}$$

[6] 11. Graph $r = 2 + 2\cos\theta$.



[10] 12. Graph $f(x) = \frac{2x-3}{x+4}$

- a) State the domain of $f(x)$
- b) Find the zero(s)
- c) Find the y-intercept
- d) Find the horizontal asymptote, if any.



- e) Find the vertical asymptote, if any.
- f) sketch the graph. Label intercepts and dash in asymptotes.

[20] 13. Compute the value of each of the following limits. In the case that the limit is not a finite number, determine whether it is $+\infty$ or $-\infty$.

a) $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - 4x + 3}$

b) $\lim_{x \rightarrow \infty} \frac{-2x^2 - 2}{x^2 - 1}$

c) $\lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{x - 9}$

d) $\lim_{x \rightarrow 0} \frac{\frac{1}{x+4} - \frac{1}{4}}{x-4}$

[7] 14. Suppose $f(x) = -x^2 + 2x - 3$.

a) Find $f(x+h)$.

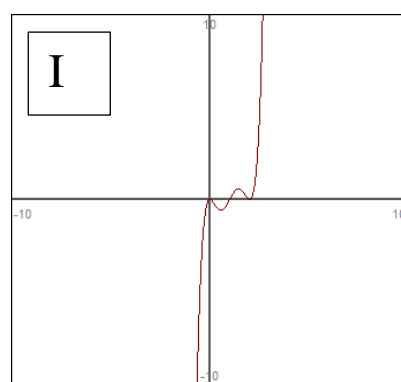
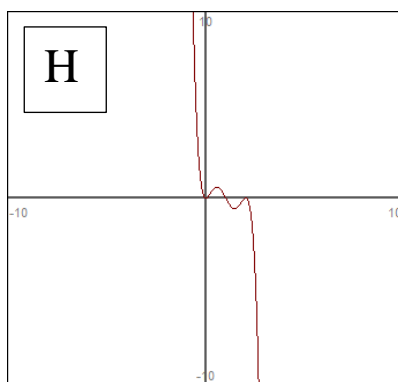
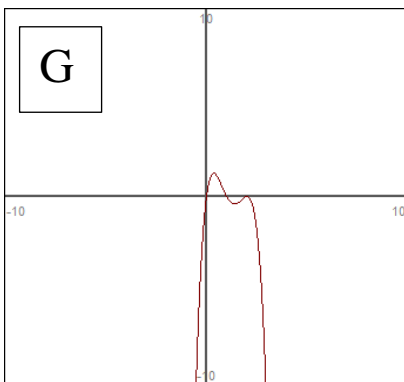
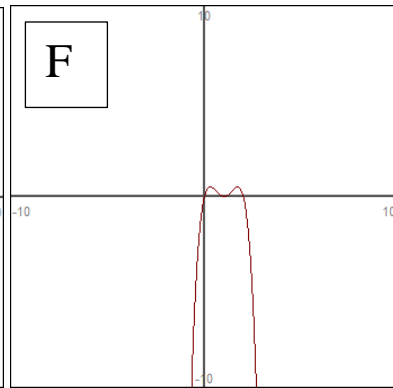
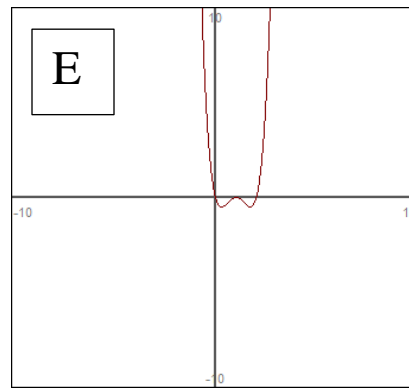
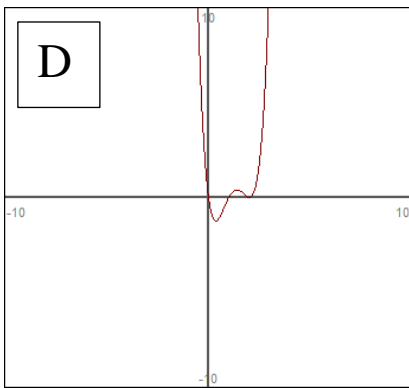
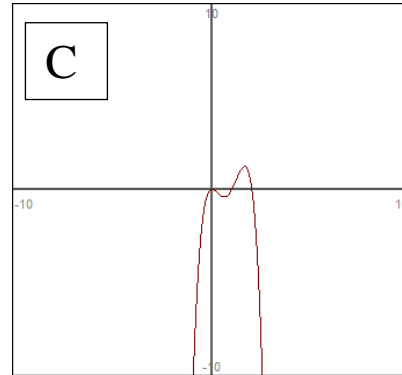
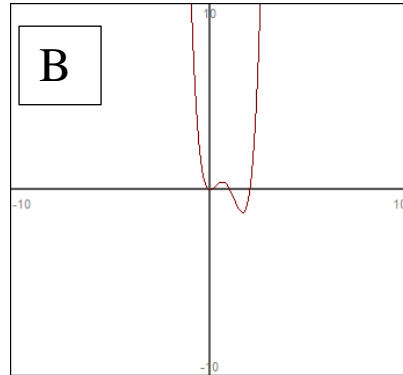
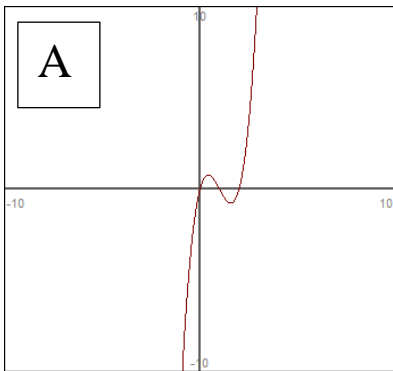
b) Compute $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$.

[9] 15. Put the letter of the corresponding graph in the answer blank:

a) $f(x) = -2x(x - 1)(x - 2)^2$ Letter of Graph Choice _____

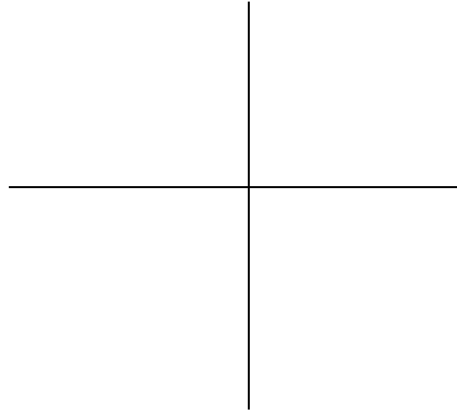
b) $f(x) = 2x(x - 1)^2(x - 2)$ Letter of Graph Choice _____

c) $f(x) = -2x^2(x - 1)(x - 2)$ Letter of Graph Choice _____



[18] 16. Graph (You must label at least 3 points and/or any asymptotes, if applicable). Fill in information.

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

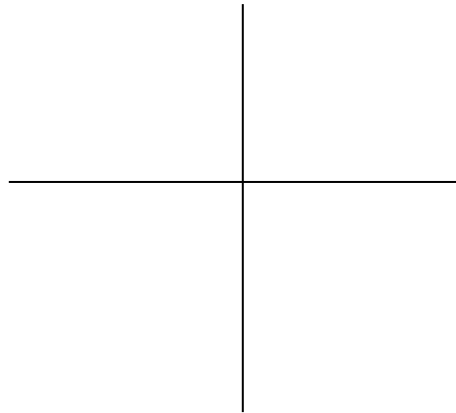


Vertex:

Zeros:

y-intercept:

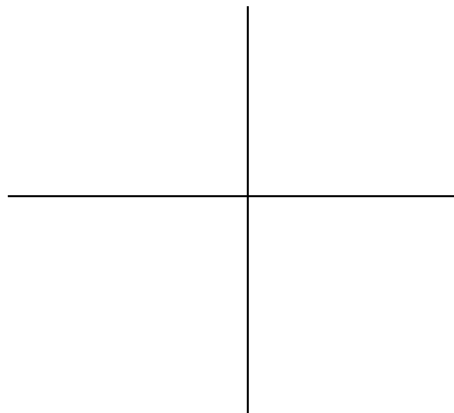
b) $y = -e^x + 3$



Equation of asymptote:

y-intercept:

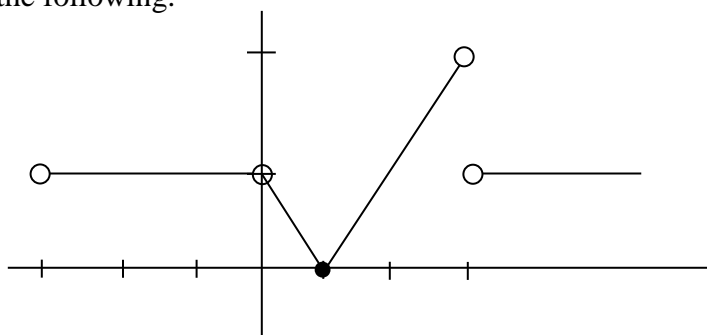
c) $y = \ln(x-4)$



Equation of asymptote:

x-intercept:

[15] 17. Evaluate the following.



a) $\lim_{x \rightarrow 3^-} f(x)$

b) $\lim_{x \rightarrow 3^+} f(x)$

c) $\lim_{x \rightarrow 3} f(x)$

d) $\lim_{x \rightarrow 0^+} f(x)$

e) $\lim_{x \rightarrow 0^-} f(x)$