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) $\cos(\frac{7\pi}{6})$ [2]

b) $\sec(\frac{7\pi}{6})$ [2]

c) $\cos\left(sin^{-1}(-\frac{\sqrt{3}}{2})\right)$ [3]

d) Indicate the **number of answers** of the following (you don't need to find the answers) [2]

a) $sin^{-1}(0.3)$ _____

b) $\sin(x) = 0.3$ on $[0,2\pi)$ _____

[12] 2. Suppose $\tan(\theta) = -\frac{1}{2}$ where θ is in Quadrant II. Find the following. Give exact values (no decimals)

a) $\cos\theta$ [4]

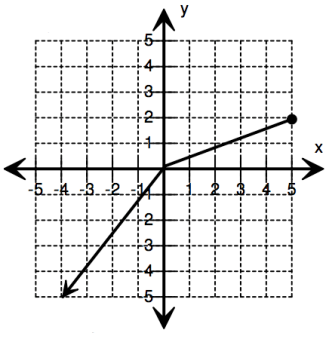
b) $\sin(2\theta)$ [5]

c) $2tan^2\theta + \frac{1}{3}$ [3]

[8] 3. State the domain in interval notation

a) $f(x) = \frac{4x}{49-x^2}$

b)



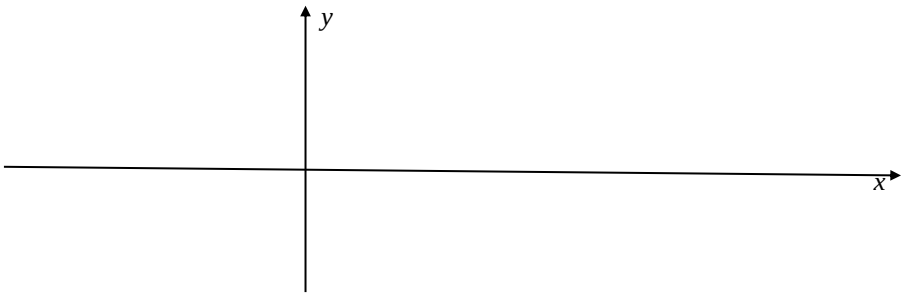
[18] 4. Solve algebraically. Give exact answers (no decimals). No work = no credit.

$a)\ 4e^{5x} - 6 = 0$

b) $5\sqrt{x} - 2 = 6$

c) $2x^2 + 5x - 12 > 0$. Give solution in interval notation.

[12] 5a. Graph at least one period.
Clearly label each graph pointing out *x*-intercepts and maximum and minimum points.
y=$2\sin(x - \pi)$



5b. Given $f(x) = -3\cos(5x - 1)$ state the information:

a) Period:

b) amplitude:

c) Phase shift.

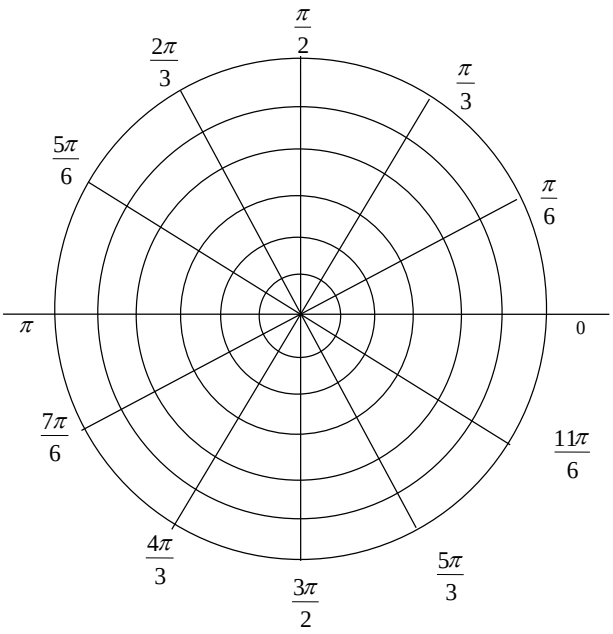
[12] 6. Solve each equation on the interval $0 \le \theta < 2\pi$. Use exact values (no calculators/decimals)

a) $\tan(\theta) = 1$

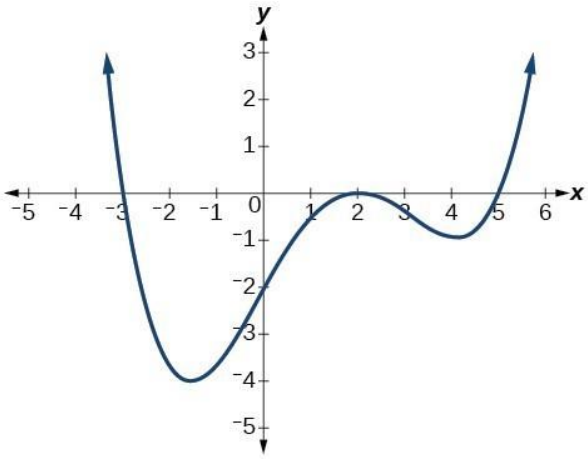
b) $2sin^2\theta - 2sin\theta = 0$

[7] 7. Find **all** solutions (the general solution) to $\cos(2\theta) = \frac{\sqrt{2}}{2}$.

[6] 8. $r = 2 - 3\cos\theta$



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



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

b) Give the coordinates (x,y) of the relative minima

c) Give the range in interval notation.

d) Is the leading coefficient of f(x) negative or positive? Explain.

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

f) State the zeros and whether the multiplicity is even or odd for each zero (root).

[14]10. Establish the identity. Next to each step should be your "reason".

a) $\frac{csc^2\theta}{1+tan^2\theta} = cot^2\theta$

b) $sinx(tanx + cotx) = secx$

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

a) $\frac{x-25}{x^2+5x-24}$

b) $\frac{5x-2}{(x-1)(x-2)^2}$

[15] 12. Consider $f(x) = \frac{2x-4}{x^2-4}$

a) State the domain of f(x)

b) Find the y-intercept

c) Find the vertical asymptote (or state none)

d) Find the zero(s)

e) Find the horizontal asymptote (or state none)

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

[4] 13. Sketch a possible graph of $f(x) = -2x(x-1)^2(x-2)^2$ using zeros, multiplicity, and ending behavior. Do not label the y-axis, only the x-axis.

[20] 14. 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 $-\infty$ if possible.

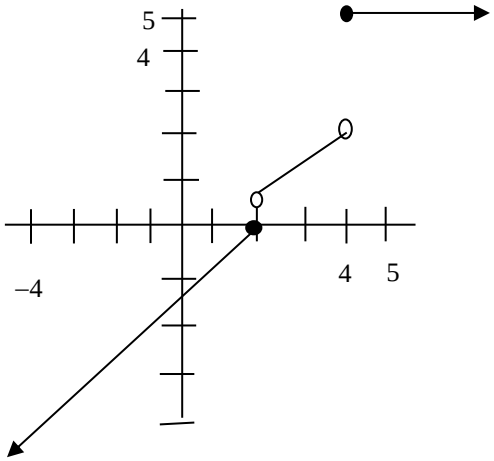
a) $\lim_{x\to\infty} \dfrac{3x^2+2x-1}{1-x^2}$

b) $\lim_{x\to 16} \dfrac{\sqrt{x}-4}{x-16}$

c) $\lim_{x\to\infty} (-2x^3+5x+8)$

d) $\lim_{x\to 3} \dfrac{12-7x+x^2}{x^2-x-6}$

[10] 15. Estimate the following



a) $\lim_{x\to 2^+} f(x)$

b) $\lim_{x\to 2^-} f(x)$

c) $\lim_{x\to 2} f(x)$

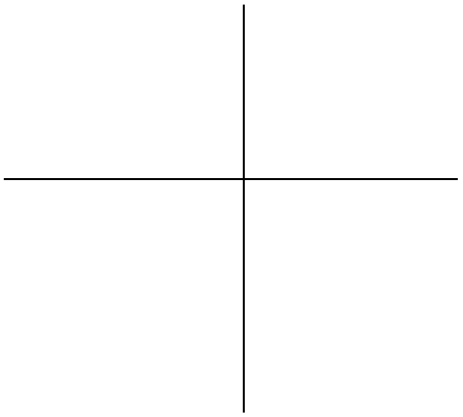
d) find f(2)

e) $\lim_{x\to 6} f(x)$

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

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

Label vertex, zeros and intercept on graph

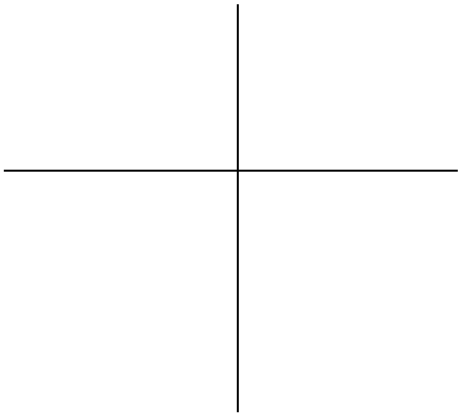


Vertex:

Zeros:

y-intercept:

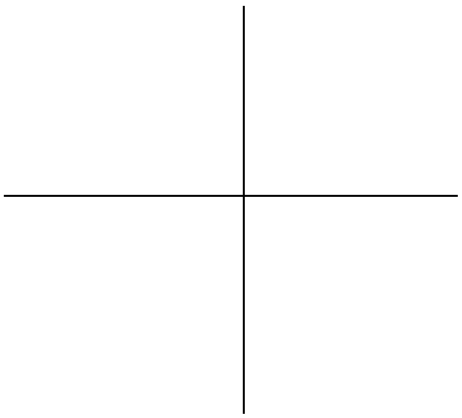
b) $y = e^{-x} + 1$



Equation of asymptote:

y-intercept:

c) $f(x) = \ln(x + 2)$



Equation of asymptote:

x-intercept:

[4]
17. Sketch the graph of a single function that has a vertical asymptote as x = 2, a horizontal asymptote at y= -3, zero when x = 1 and a y-intercept at -2. Dash in asymptotes and label intercepts.

[7] 18. Suppose $f(x) = 2x - x^2$. Find the following: $\frac{f(x+h)-f(x)}{h}$