

[16] 1. Find the exact values of

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

b) $\tan \frac{11\pi}{6}$

c) $\sin \left(\cos^{-1} \frac{2}{5} \right)$

d) $\sin^{-1} \left(\cos \frac{7\pi}{6} \right)$

[12] 2. Find the range of

a) $y = 2 \cos \left(x + \frac{\pi}{2} \right) - 3$

b) $y = \arcsin x$

c) $y = \frac{1}{3 - \sin x}$

[12]3. Suppose $\cos \theta = \frac{x}{4}$ for some acute angle θ . Express in terms of x .

a) $\sin \theta$

b) $\sin 2\theta$

c) $\cos 2\theta$

[15]4. Solve each equation on the interval $0 \leq \theta < 2\pi$.

a) $\sin \theta = \frac{1}{\sqrt{2}}$

b) $\cos^2 \theta + 2 \cos \theta = 0$

c) $\sin 2\theta = 1$

[10] 5. Solve the following equations.

a) $\frac{2}{x+2} + \frac{1}{x^2-4} = \frac{4}{x-2}$

b) $\ln(x-3) + \ln(x-5) = 2\ln(x)$

[14] 6. Graph each function over one **complete period**.

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

a) $y = 3\cos x$

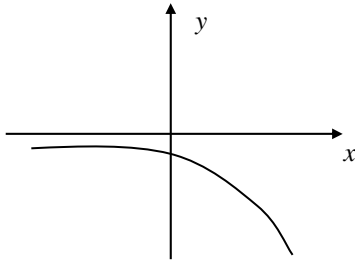


b) $y = 2\sin\left(x + \frac{\pi}{3}\right)$



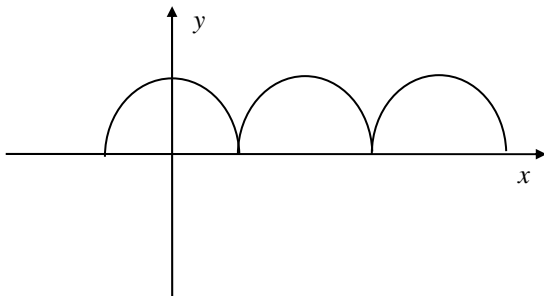
[16] 7. Match each graph with an appropriate equation. (Not all equations will match with a graph.)

1)



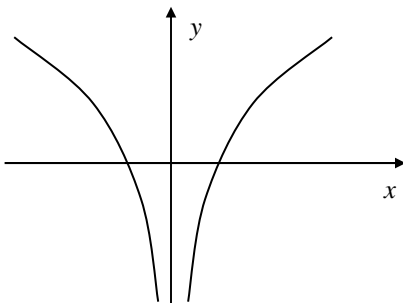
1 goes with _____

2)



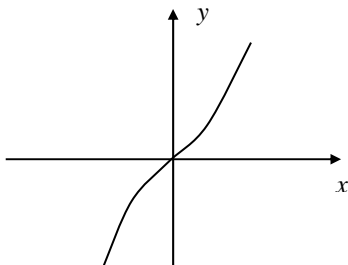
2 goes with _____

3)



3 goes with _____

4)



4 goes with _____

a) $y = \arcsin x$

b) $y = x^3$

c) $y = \tan^{-1} x$

d) $y = \csc x$

e) $y = |\cos x|$

f) $y = -e^{-x}$

g) $y = -\ln x$

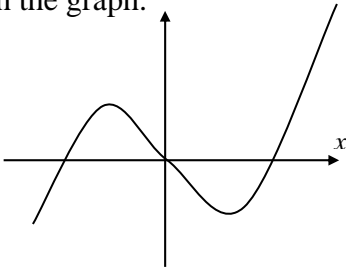
h) $y = 2 - e^{-x}$

i) $y = |\ln x|$

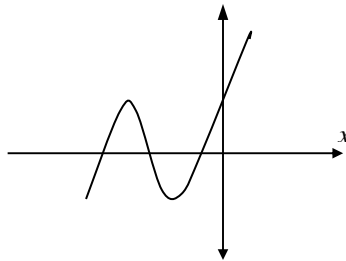
j) $y = \ln|x|$

b) Match the graph.

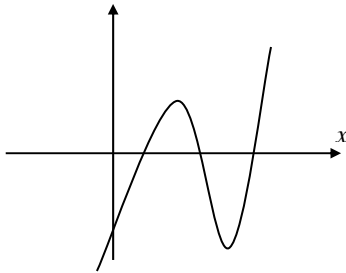
_____ A.



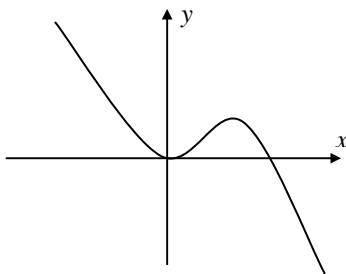
_____ B.



_____ C.



_____ D.



1. $y = x^3 - x^2$

2. $y = x^3 - 6x^2 + 11x - 6$

3. $y = x^3 - x$

4. $y = x^3 + 6x^2 + 11x + 6$

5. $y = -x^3 + x^2$

6. $y = x^4 - 1$

7. $y = x$

[10] 8. Establish the identity: ***Choose any two.***

a) $\sin^4 \theta - \cos^4 \theta = 1 - 2\cos^2 \theta$

b) $\sin^2 \theta \cos^2 \theta = \frac{1}{8} - \frac{1}{8} \cos 4\theta$

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

[08] 9. Decompose into partial fractions and determine the coefficients.

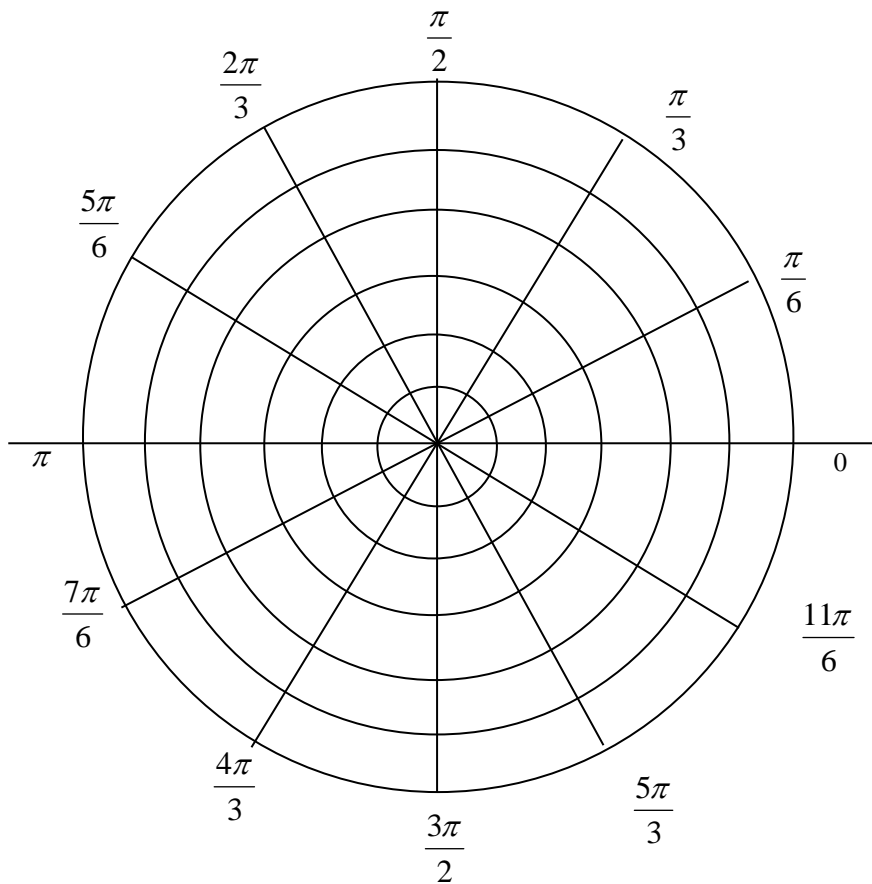
a) $\frac{2}{(x-2)(x+3)}$

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

[14] 10. Consider $r = 1 - \sin \theta$ and $r = \sin \theta$.

a) Find all points of intersection. Only an algebraic solution will receive full credit.

b) Graph $r = 1 - \sin \theta$ and $r = \sin \theta$ on the same graph. Label points of **intersection**.



[8] 11. Solve the following inequalities.

a) $x^3 - x \leq 0$

b) $\frac{x+1}{x-2} < \frac{x-3}{x-1}$

[20] 12. 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) $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 - 4}$

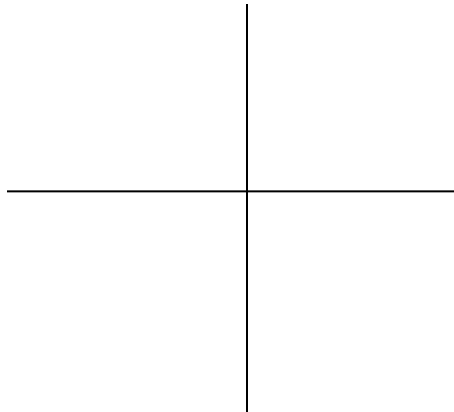
b) $\lim_{x \rightarrow \infty} \frac{x^2 + 3x - 500}{1 - 2x^2}$

c) $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ where $f(x) = x^2 + 1$

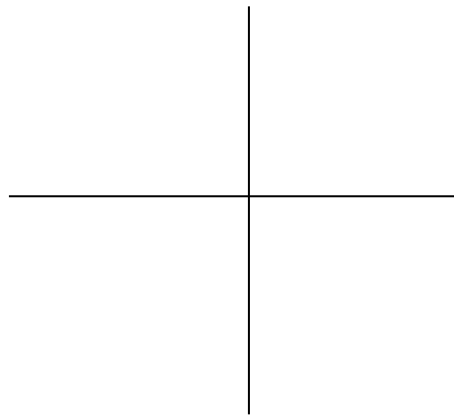
d) $\lim_{x \rightarrow 2} \frac{x-1}{x-2}$

[15] 13. Graph. (You must label at least 3 points and any asymptotes, if applicable.)

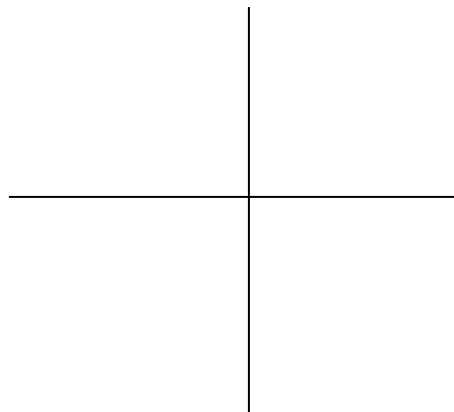
a) $y = 1 - (x - 1)^2$



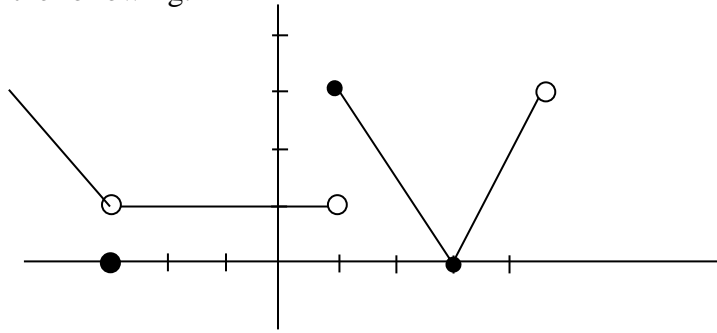
b) $y = (x - 1)(x - 3)^2$



c) $y = \ln(x - 2)$



[15]14. Evaluate the following.



a) $\lim_{x \rightarrow 1^+} f(x)$

b) $\lim_{x \rightarrow 1^-} f(x)$

c) $\lim_{x \rightarrow 1} f(x)$

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

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

[06] 15. Find the domain of the following functions.

a) $y = \frac{1}{x^2 - x - 2}$

b) $y = \frac{3}{\sqrt{x^2 - 9}}$

[09] 16. Given that $f(x) = x^3 + 6x^2 - x - 30$.

a) Using the synthetic division find $f(2)$.

b) Factorize $f(x)$ completely.