AP Calculus AB - Due on the first day of classes.

Pre-Calculus Review

Evaluate the given Statments.

Solve for x .

1) $x + 3 = \frac{10}{x}$

2) $4x\,(x + 2) - 3\,(16 - 2x) = 18x$

3) $1 + \log_4(x) = 2$

4) $15 - e^{x-2} = 7$

5) $4 + \ln(2^x) = 10$

6) $\frac{x^2 - 2}{x + 1} = 0$

7) $x^2 e^x - 4e^x = 0$

8) $x^3 - 9x = 5$ [Solve graphically on Calculator.]

Evaluate without using a calculator.

9) $3^{-2} =$

10) $8^{2/3} =$

11) $\log_2(16) =$

12) $\ln\left(e^2\right) =$

13) $2^{\log_2(8)} =$

14) $\sin\left(\frac{2}{3}\pi\right) =$

15) $\cos(\pi) =$

16) $\sin(\pi) =$

17) $\cos\left(-\frac{\pi}{6}\right) =$

18) $\tan\left(\frac{5}{4}\pi\right) =$

19) $\sec^2\left(\frac{\pi}{4}\right) =$

20) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) =$ { Invers Trig Functions take Ratios Inputs & give Rotation Outputs.}

21) $\sin^{-1}\left(\frac{1}{2}\right) =$

Domain of a Function (on xy–axis) – The x–values that a function can process to give real number output y–values.

State the Three cases where an x–value will not be able to give a real number y–value :

1)

2)

3)

Determine the Domain of the given Functions.

22) a) $y = x^3 - 5x + 11$

b) $y = \dfrac{x}{x - 2}$

c) $f(x) = \sqrt{x - 5}$

d) $g(x) = \dfrac{2}{\sqrt{x + 1}}$

e) $h(x) = 2^x - 12$

f) $k(x) = \ln(x+1)$

Find the Vertical Asymptotes of the given functions. Confirm by graphing.

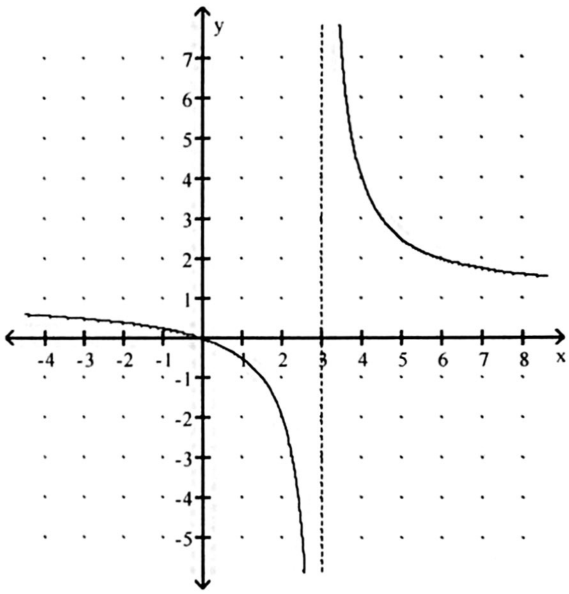
23) a) $f(x) = \frac{x - 1}{x + 5}$ b) $g(x) = \frac{5x}{x^2 - x - 12}$ c) $k(x) = \frac{x - 2}{x^2 - 2x}$

Use limits to describe the behavior of the rational function near the vertical asymptote.

24)

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

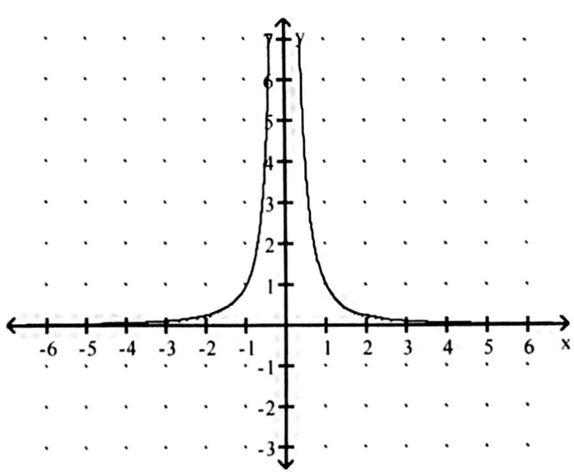
$\lim_{x \to 3^-} f(x) =$ $\lim_{x \to 3^+} f(x) =$



25)

$f(x) = \frac{1}{x^2}$

$\lim_{x \to 0^-} f(x) =$ $\lim_{x \to 0^+} f(x) =$



26) **<u>Horizontal Asymptote</u> – A y–values that Function Values get closer and closer to as x–values go to positive and/or negative infinity.**
Graphically the function flattens out to the Horizontal Asymptote.

<u>Horizontal Asymptotes for Rational Functions [Fraction Equations]</u>

<u>If the Degree is Larger in Denominator there is a Horizontal Asymptote at:</u>

<u>If the Degree is the Same in Numerator & Denominator there is a Horizontal Asymptote at:</u>

<u>If the Degree is Larger in Numertor there is:</u>

Find the Horizontal asymptote of the given functions. Confirm your observation with a calculator.

27) a) $g(x) = \dfrac{2x}{x^2 - 1}$ b) $g(x) = \dfrac{2x^2}{x^2 - 1}$ c) $g(x) = \dfrac{2x^3}{x^2 - 1}$

For the given function, find the horizontal asymptotes if any and determine the end behavior with limits .

28) $f(x) = \dfrac{10}{x^2 - x - 10}$ HA: $\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

29) $f(x) = \dfrac{9x^4 + 1}{2x^4 + x^3 - 11}$ HA: $\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

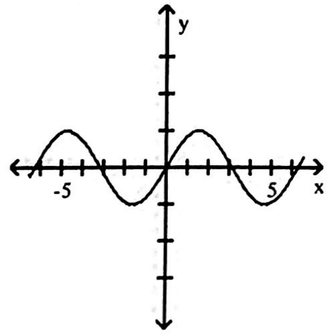
30) $f(x) = \dfrac{-x^3 + 1}{x + 1}$ HA: $\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

31) $f(x) = e^x$ HA: $\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

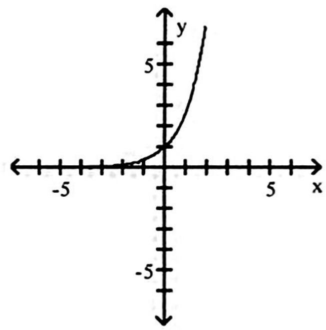
Match the Function to its graph.

32)

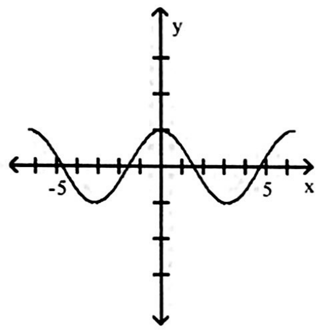
a) $f(x) = e^{x}$ ___



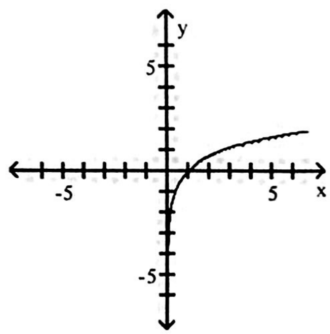
b) $f(x) = \ln(x)$ ___



c) $f(x) = \sin(x)$ ___



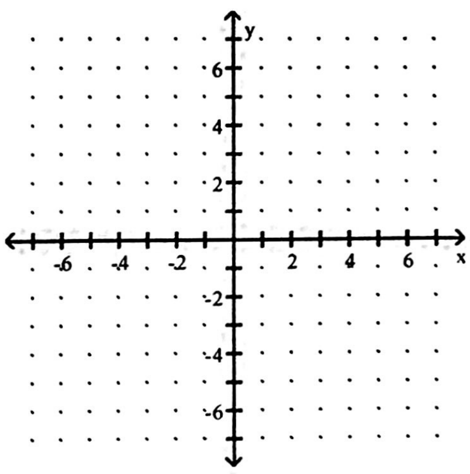
d) $f(x) = \cos(x)$ ___



Graph the piecewise-defined function.

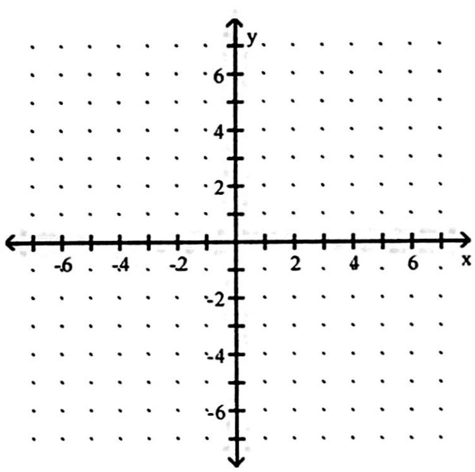
33)

$$g(x) = \begin{cases} \dfrac{1}{x}, & x \le 1 \\ x + 1, & x > 1 \end{cases}$$



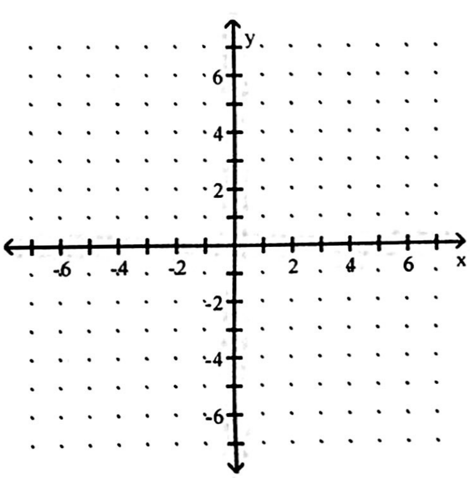
34)

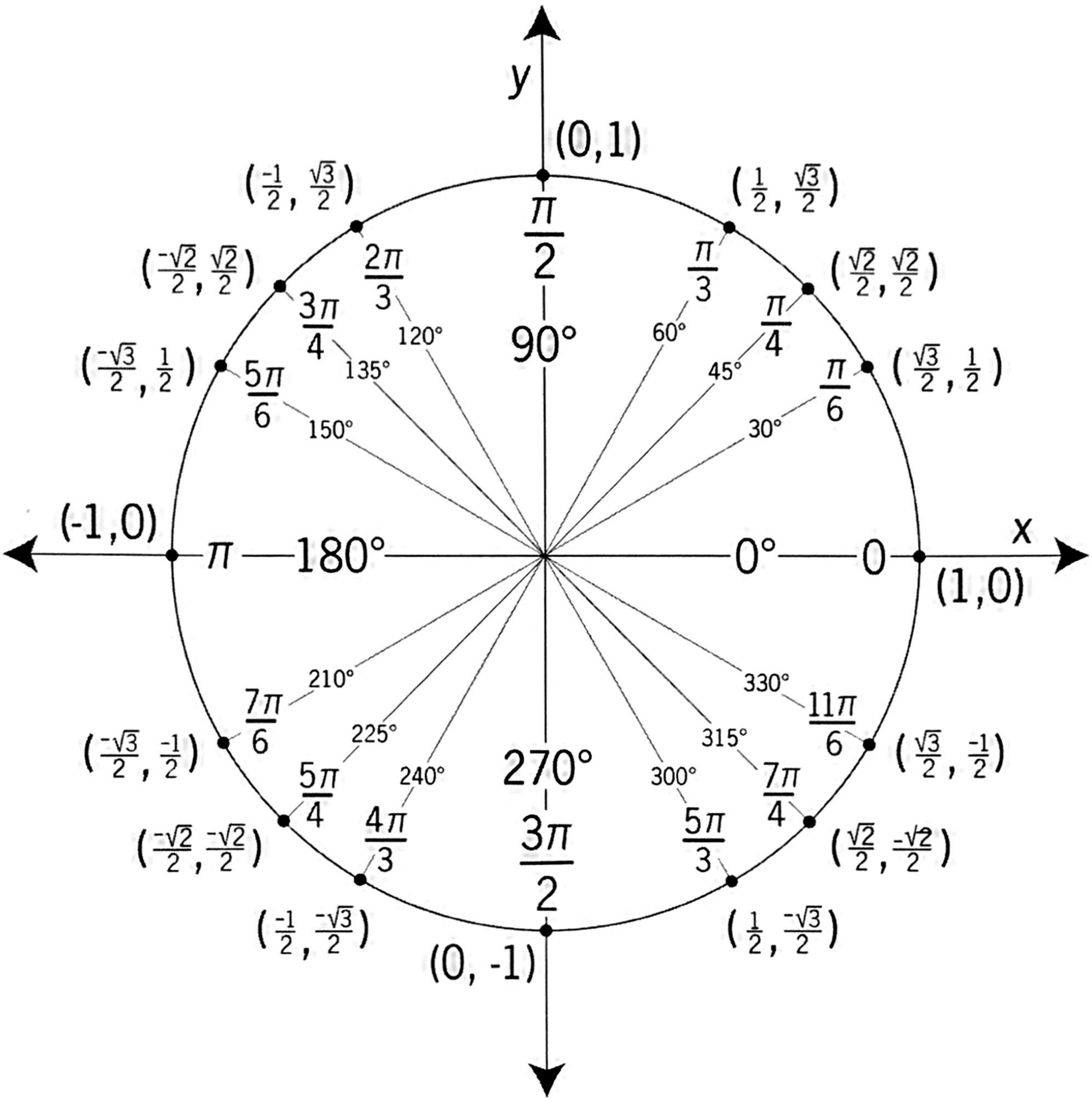
$$f(x) = \begin{cases} x^2, & x \ne 1 \\ 2, & x = 1 \end{cases}$$



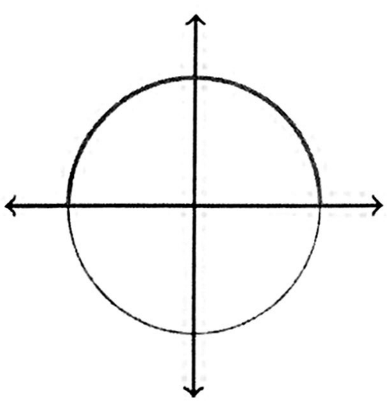
35)

$$h(x) = \begin{cases} x^3 + 1, & x \le 1 \\ 2, & 1 < x \le 3 \\ -2x + 11, & x > 3 \end{cases}$$





$[0, \pi]$, used for $\cos^{-1}$



$[-\frac{\pi}{2}, \frac{\pi}{2}]$, used for $\sin^{-1}$ and $\tan^{-1}$