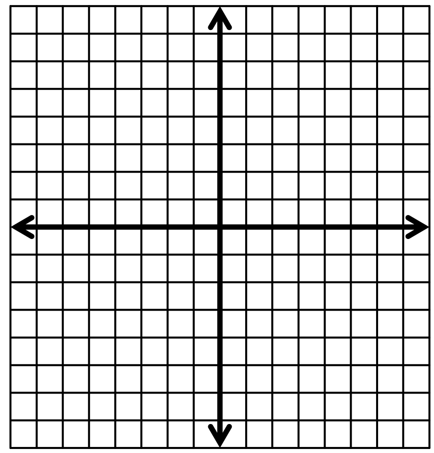
Graphing, Continuity, and Limits for Rational Functions

Sketch the function $f(x)=\dfrac{2x^2-5x-12}{x^2-6x+8}$ and complete the following:



$f(x)$ has a 1) vertical asymptote at x = _____

2) horizontal asymptote of y = ___

3) x – intercept of ____

4) y – intercept of ____

5) removable discontinuity at x = ______

and a 6) non-removable discontinuity at x = ______

Evaluate the following:

7) $f\left(-\frac{3}{2}\right)$_____ 8) $f(0)=$ ______ 9) $f(2)=$____ 10) $f(4)=$____

Evaluate the following limits or state "does not exist"

11) $\lim\limits_{x\to -3/2} f(x)=$_____

12) $\lim\limits_{x\to 0} f(x)=$______

13) $\lim\limits_{x\to 2^-} f(x)=$_____

14) $\lim\limits_{x\to 2^+} f(x)=$_____

15) $\lim\limits_{x\to 2} f(x)=$______

16) $\lim\limits_{x\to 5/2} f(x)=$______

17) $\lim\limits_{x\to 4^-} f(x)=$______

18) $\lim\limits_{x\to 4^+} f(x)=$______

19) $\lim\limits_{x\to 4} f(x)=$______

20) $\lim\limits_{x\to +\infty} f(x)=$_____

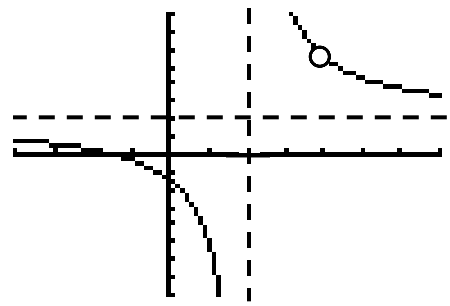
(Form B)

Answer Key

Graphing, Continuity, and Limits for Rational Functions

Sketch the function $f(x)=\dfrac{2x^2-5x-12}{x^2-6x+8}$ and complete the following:

$$f(x)=\frac{2x^2-5x-12}{x^2-6x+8}=\frac{(2x+3)\cancel{(x-4)}}{\cancel{(x-4)}(x-2)}=\frac{(2x+3)}{(x-2)},\ \text{for } x\neq 4$$



$f(x)$ has a 1) vertical asymptote at x = 2

2) horizontal asymptote of y = 2

3) x – intercept of -3/2

4) y – intercept of -3/2

5) removable discontinuity at x = 4

and a 6) non-removable discontinuity at x = 2

Evaluate the following:

7) $f\left(-\frac{3}{2}\right)$ 0 8) $f(0)=$ -3/2 9) $f(2)=$ Undef. 10) $f(4)=$ Undef.

Evaluate the following limits or state "does not exist"

11) $\lim\limits_{x\to -3/2} f(x)=$ 0

12) $\lim\limits_{x\to 0} f(x)=$ -3/2

13) $\lim\limits_{x\to 2^-} f(x)=$ $-\infty$

14) $\lim\limits_{x\to 2^+} f(x)=$ $+\infty$

15) $\lim\limits_{x\to 2} f(x)=$ D.N.E.

16) $\lim\limits_{x\to 5/2} f(x)=$ 16

17) $\lim\limits_{x\to 4^-} f(x)=$ 11/2

18) $\lim\limits_{x\to 4^+} f(x)=$ 5.5

19) $\lim\limits_{x\to 4} f(x)=$ 5.5

20) $\lim\limits_{x\to +\infty} f(x)=$ 2

(Form B)