Unit 1 HW Answers (Final)

HW 101 (Some Answers)

1. 2

3. 4

5. Since $\lim\limits_{x\to -1^-} g(x) \neq \lim\limits_{x\to -1^+} g(x)$, $\therefore$ $\lim\limits_{x\to -1} g(x)$ does not exist.

9. 1

16. 5

23. $\frac{1}{5}$

24. $-\frac{1}{10}$

25. –48

26. $\frac{1}{2}$

27. $\frac{1}{2}$

28. 12

29. 32

30. $\frac{1}{8}$

HW 102

1. 27

2. $\frac{1}{2}$

3. $-\frac{1}{16}$

4. $-\frac{1}{2\sqrt{2}}$

5. $-\frac{2}{19}$

6. e

7. $-\frac{1}{4}$

8. –1

9. $\frac{1}{8}$

10. 108

11. $-\frac{1}{9}$

12. –2

13. $2\sqrt{3}$

14. $\frac{1}{2}$

15. 1

16. 3

HW 103 (Some Answers)

1. 0

2. $-\frac{5}{2}$

5. ∞

6. $\frac{1}{4}$

10. 0

14. $y = 1$ and $y = -1$ (Make sure to justify!)

15. $y = 1$ and $y = -\frac{1}{3}$ (Make sure to justify!)

17. Vertical asymptote: $x = -2$ because $\lim\limits_{x\to -2^+} F(x) = -\infty$ (could have also said because $\lim\limits_{x\to -2^-} F(x) = \infty$).

Horizontal asymptote: $y = 5$ because $\lim\limits_{x\to\infty} F(x) = 5$

20. yes at $\left(\frac{19}{5}, 2\right)$.

21. $y = x - 4$

HW 104 (Some Answers)

2. a. $f(2) = 3$

b. $\lim_{x\to 2^-} f(x) = \lim_{x\to 2^-} (x+1) = 3$

$\lim_{x\to 2^+} f(x) = \lim_{x\to 2^+} (2x-1) = 3$

$\therefore \lim_{x\to 2} f(x) = 3$

c. $Since\ f(2) = \lim_{x\to 2} f(x),$
$f(x) is\ continuous\ at\ x = 2.$

6. $k = \frac{9}{16}$

7. $a = -\frac{6}{5}$, $b = \frac{18}{5}$

8. f(x) is continuous everywhere except at x = 9 and x = –4.
At x = 9, there is a removable discontinuity (hole) and at
x = –4 there is a non-removable discontinuity (infinite).

9. at x = 3 $\left(3, \frac{11}{5}\right)$

13. *f(x)* is a polynomial ∴ *f(x)* is continuous on [0,1].
$f(0) = -1 \quad f(1) = 10$
Since –1 < 0 < 10, by IVT there exists a number c such that $f(c) = 0$.

c ≈ .215

15. $\frac{1}{8}$

16. $-\frac{27}{2}$

17.
$\lim_{x\to 0^+} \frac{|x|}{x} = 1$

$\lim_{x\to 0^-} \frac{|x|}{x} = -1$

Since $\lim_{x\to 0^+} \frac{|x|}{x} \neq \lim_{x\to 0^-} \frac{|x|}{x}$, $\lim_{x\to 0} \frac{|x|}{x}$ does not exist.

18. -3

19. $-\infty$

20. $-\frac{1}{16}$

21. $\frac{3}{5}$

22. 0

HW 105

1. $-\frac{3}{4}$

2. ∞

3. 0

4. ∞

5. 0

6. 0

7. 0

8. $\frac{1}{3}$

9. 0

10. 0

11. $-\frac{2}{3}$

12. π

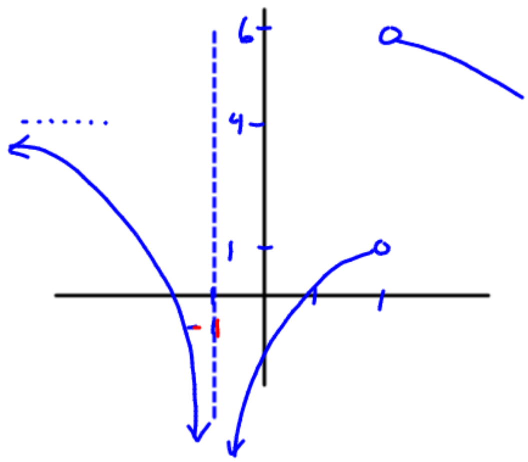
13. $\frac{1}{6}$

14. -1

15. $-\infty$

16. $\frac{1}{\sqrt{3}}\ or\ \frac{\sqrt{3}}{3}$

17. Answers will vary. Possible solution:



HW 106 (Some answers)

1. 4

2. B

3. 0

4. 0

5. 10

6. 20

8. A

HW 107

1.

a) –4

b) $y-4 = -4(x+2)$

c) $y-4 = \frac{1}{4}(x+2)$

2.

a) –2

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

c) $y+3 = \frac{1}{2}(x-1)$

3. a) –1
b) $y-1=-1(x-2)$
c) $y-1=x-2$

4. a) –3
b) $y+1=-3(x-0)$
c) $y+1=\frac{1}{3}(x-0)$

5. $f'(x)=-2x$

6. $f'(x)=\frac{-2}{x^2}$

7. $f(x)=x^3, at\ x=3$ (limit def.)

8. $f(x)=x^3, at\ x=a$ (alternative def.)

9. $f(x)=\sqrt{x}, at\ x=9$ (limit def.)

10. $f(x)=\frac{7}{(3x+5)^2}, at\ x=1$

11. $f(x)=\sin x\,, at\ x=\frac{\pi}{2}$

12. $f(x)=3x^2+2x, at\ x=a$

13. $f(x)=\frac{5}{x+2}, at\ x=4$

14. $f(x)=\sqrt{x-2}, at\ x=6$

15. $f(x)=\tan x\,, at\ x=\pi/4$

16. $f(x)=\frac{1}{x}, at\ x=3$

HW 108

1.	D	**2.**	D	**3.**	A	**4.**	C
5.	B	**6.**	D	**7.**	C	**8.**	E
9.	E	**10.**	D	**11.**	C	**12.**	E

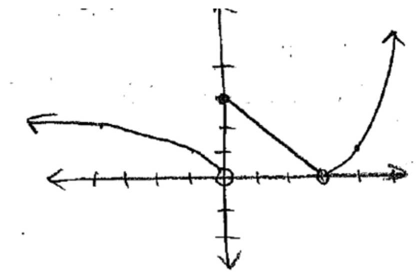
13.	0	**14.**	2
15.	0	**16.**	∞
17.	–1/8	**18.**	–1
19.	0	**20.**	–1/2
21.	1/2	**22.**	0

23. a)

i.	3	ii.	0	iii.	Does not exist
iv.	0	v.	0	vi.	0

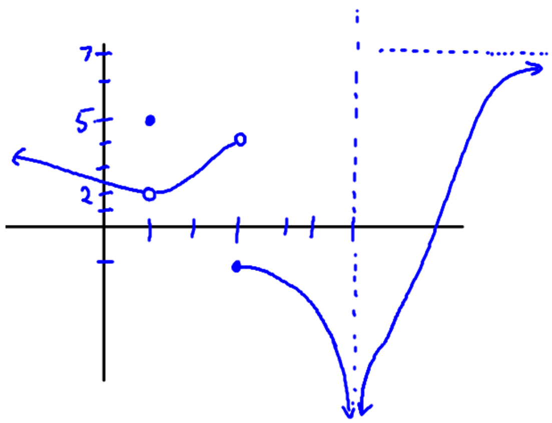
b) *f(x)* is continuous everywhere except at x = 0 and x = 3.
At x = 0, there is a non-removable (jump) discontinuity.
At x = 3, there is a removable (hole) discontinuity.

c)

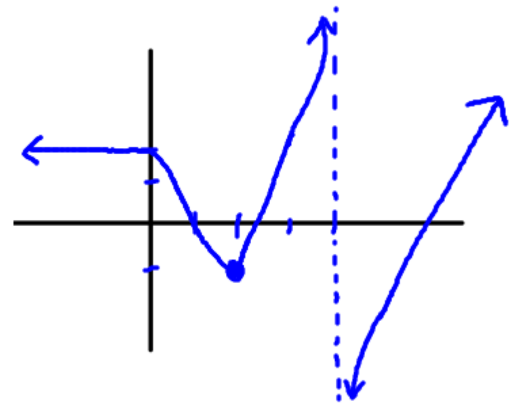


#24 – 26 Answers may vary. Check that your graph fulfills all conditions, and passes the vertical line test. Here are a few:

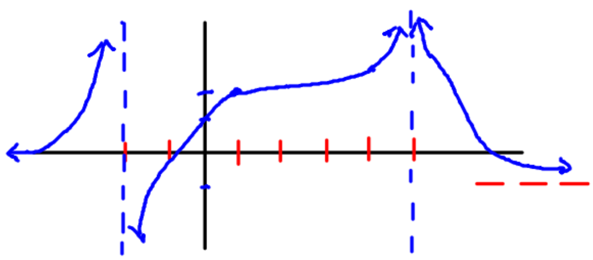
24.



25.



26.



27. $f(x)$ is continuous on [–1,3]. $f(-1) = -4, f(3) = 4$. Since –4 < 0 < 4, by IVT there exists a value c on [–1, 3] such that *f(c)* = 0.

28. $g(x)$ is continuous on [0, 2]. $g(0) = 9, g(2) = 1$. Since 1 < 6 < 9, by IVT there exists a value c on [0, 2] such that *g(c)* = 6.

29. a) $f'(2) = 10$
b) $y - 4 = 10(x - 2)$

30. At x = 0, m = 6. $y-2=6(x-0)$

At x = –1, m = $\frac{3}{8}$. $y-\frac{1}{2}=\frac{3}{8}(x+1)$