1a) Domain: $(-\infty,\infty)$

Range: $(-\infty,4]$

1b) Domain: $[0,6]$

Range: $[0,6]$

1c) Domain: $[-8.\infty)$

Range: $[0,\infty)$

2a) Increasing: $(-3,-0.2)$

Decreasing: $(-\infty,-3)\cup(-0.2,\infty)$

Local Max: 2323.3997

Local Min: 0

LEB

$\lim_{x\to-\infty} f(x)=\infty$

REB

$\lim_{x\to\infty} f(x)=-\infty$

2b) Increasing $(-\infty,-0.7863)\cup(2.1196,\infty)$

Decreasing: $(-0.7863,2.1196)$

Local Max 8.2088

Local Min: -4.0607

LEB

$\lim_{x\to-\infty} f(x)=-\infty$

REB

$\lim_{x\to\infty} f(x)=\infty$

2c) Decreasing $[5,\infty)$

Local Max: 5

Abs Max: 5

REB

$\lim_{x\to\infty} f(x)=-\infty$

3a) HA: y=2

VA: x=5

$\lim_{x\to5^+} f(x)=\infty$

$\lim_{x\to5^-} f(x)=-\infty$

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

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

3b) HA: y=0 VA: x=-3

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

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

4a) Model $y = 22(1.23)^t$

1st Answer: 61

2n Answer: 8 years.

4b) Model $y = 20890(0.94)^t$

1st Answer: Between 11 and 12 years (really, 12 years)

2nd Answer: $17350.90

4c) Model $y = 37(0.5)^{t/29}$

1st Answer: 0.3258

2nd Answer: 29 days

5a) HA: y=0, and y=207

Initial Value: 23

Max Population: 207

5b) HA: y=0 and y=4000

Initial Value: 10

Max Population: 4000

6a) x=0 6b) x=-3.2287

7a) -0.7265 7b) -1.3764 7c) -0.4339 7d) -2.3048 7e) 2.5593

8a) 0.7297, 2.4119 8b) 1.7141, 4.5690 8c) 0.3398, 2.8-18 8d) 0.3398, 2.8018, $\frac{3\pi}{2}$

9) Length of ladder: 125.9246 inches

Angle of elevation: 97.1781

10) 4.4744 MPH

11) R=14 S= 25π $\theta = \frac{39\pi}{71}$

12) Distance from start to finish: 125.7237 nautical miles.

Bearing of boat at end of trip: 273.9272 degrees.

13) $p = \langle -251.7282, -310.8584 \rangle$

$w = \langle -23.1767, -38.5725 \rangle$

$v = \langle -2574.9049, -349.4309 \rangle$

Speed 444.6062 MPH $\theta = 231.8071$

14) $proj_v u = \langle -1.6385, -6.0077 \rangle$

$u = \langle -1.6385, -6.0077 \rangle + \langle -0.3615, 13.0077 \rangle$

15) $x(t) = 56\cos(44)t$

$y(t) = -16t^2 + 56\sin(44)t$

Height after 1.5 seconds: 25.4337 ft

Horiz Dist traveled after 1.5 seconds: 60.4245 ft

Max height: 26.2090 ft

Horiz Dist traveled to max height: 51.5582 ft

16) $a_n = 54321 - 111(n-1)$

$a_1 = 54321 \qquad a_n = a_{n-1} - 111$

$a_{18} = 52434$

$S_{18} = 960795$

17) $g_n = 5764801\left(\frac{1}{7}\right)^{n-1}$

$g_{11} = \frac{1}{49}$

$g_1 = 5764801$

$S_{11} = 6729101.163$

$S = 6725601.167$

18a) Right 3

Vert Stretch of 3

Up 5

Vertical Flip

Domain: $(-\infty, \infty)$

Range: $(-\infty, 5]$

Is Not 1-to-1

18b) Vertical Stretch of 7

Right 2

Horizontal Flip

Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

Is 1-to-1

18c) Horiz Stretch of 4

Vertical Flip

Up 11

Domain: $[0, \infty)$

Range: $(-\infty, 11]$

Is 1-to-1

19a) x-int(s): -3,0,4

y-int: 0

19b) x-int(s): 4, -4, -1

y-int: -16

19c) x-int(s): 1,5

y-int: -5

20)

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

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

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

$\lim_{x\to3^-} f(x)=-\infty$

$\lim_{x\to3^+} f(x)=\infty$

$\lim_{x\to\infty} f(x)=1^+$

21a) x-int (2,0), (-2,0)

y-int $\left(0,\frac{4}{9}\right)$

Asymptotes: x=3, x=-3, y=1

21b) Holes (-1,1), $\left(\frac{4}{3},\frac{1}{8}\right)$

y-int $\left(0,\frac{1}{4}\right)$

Asymptotes: $x=-\frac{4}{3}$,y=0

21c) x-int $\left(\frac{5}{4},0\right)$ (-1,0)

y-int $\left(0,\frac{5}{3}\right)$

Asymptotes: x=3, $y=4x+11$

22) All of them 23) D 24) E 25) B 26) C 27) E

28a) Amp=5 pd= $\frac{2\pi}{3}$

P.S.= $\frac{\pi}{3}$ V.S.=4

28b) Amp=3 pd= 4π

P.S.= π V.S.=-1

29) $r=\frac{5\sin\theta}{2}$

30a) $y = \pm\sqrt{4-x}$ 30b) $y = \frac{1}{x}$

31a) (0,6) 31b) $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ 32a) $\left(3\sqrt{2}, \frac{3\pi}{4}\right)$ 32b) $\left(1, \frac{11\pi}{6}\right)$

33a) $\frac{8\pi}{3}$, $-\frac{4\pi}{3}$ 33b) 675, -45

34a) 1 34b) $-\frac{1}{2}$ 34c) $-\frac{2}{\sqrt{3}}$ 34d) $\frac{1}{2}$ 34e) 1 34f) Undefined 34g) 0

35a) $\frac{\pi}{4}$ 35b) $-\frac{\pi}{6}$ 35c) Undefined 35d) $\frac{\pi}{4}$

36) 2 37a) x=2, x=-2, $x = \pm i\sqrt{3}$ 37b) x=1, x=$\frac{1}{2}$, $x = \pm 3i$

38) Check with a friend, or teacher.

39a) 318 39b) 20

40a) $a_n = 3\left(\frac{1}{2}\right)^{n-1}$ $r = \frac{1}{2}$ 40b) $a_n = 3 + 6(n-1)$ d=6

$a_1 = 3$ $a_n = \frac{a_{n-1}}{2}$ $a_1 = 3$ $a_n = a_{n-1} + 6$

$a_{100} \approx 0$ $a_{100} = 597$