Review Sheet for Test #3

Compute the difference quotient for the functions.
1) $f(x) = 4x^2 - 7x + 15$ 2) $h(x) = 2x^2 - 5x - 11$

For the given function and root, (1) solve for c, (2) then find the exact value of the remaining roots, (3) then graph the function, indicating the roots and the viewing window.
3) $f(x) = 2x^3 + 16x^2 + 33x + C$, root: -5   4) $g(x) = 3x^3 - 23x^2 + 12x + c$, root: 7

Solve the inequality and express your answer on a number line and as an interval.

5) $\frac{x+10}{x-15} \geq 0$ 6) $\frac{3x-5}{25x-17} < 0$

Find the product/quotient and write the result in standard complex form.
7) $\frac{32(cos(255)+isin(255))}{8(cos(15)+isin(15))}$ 8) $11(cos(176°) + isin(176°)) * 9(cos(154°) + isin(154°))$

Find the inverse for the function.
9) $f(x) = \frac{8}{x+10}$ 10) $y = \frac{x+2}{x-9}$

Find the magnitude and direction angle for the given vector.
11) $v = \langle -4, -4\sqrt{3} \rangle$ 12) $u = \langle 13, -13 \rangle$

Find all exact solutions in radians.
13) $cos^2(x) - cos(x) = 0$ 14) $tan^2(x) - \sqrt{3}tan(x) = 0$

Let $u = Ln(x)$ and $v = Ln(y)$. Express in terms of u, and v.
15) $Ln\left(\sqrt{x^7 \sqrt[13]{y}} \right)$ 16) $Ln\left(\frac{\sqrt{y^9}}{x^{19}} \right)$

Find the domain, asymptotes, and x-intercepts of the function, and then sketch its graph.
17) $f(x) = -Log(x - 2)$ 18) $f(x) = Ln(14 - 2x)$

19) The initial population of a village is 65 thousand and growing at a rate of 5.8% per
      year. Round your answers to the nearest tenth.
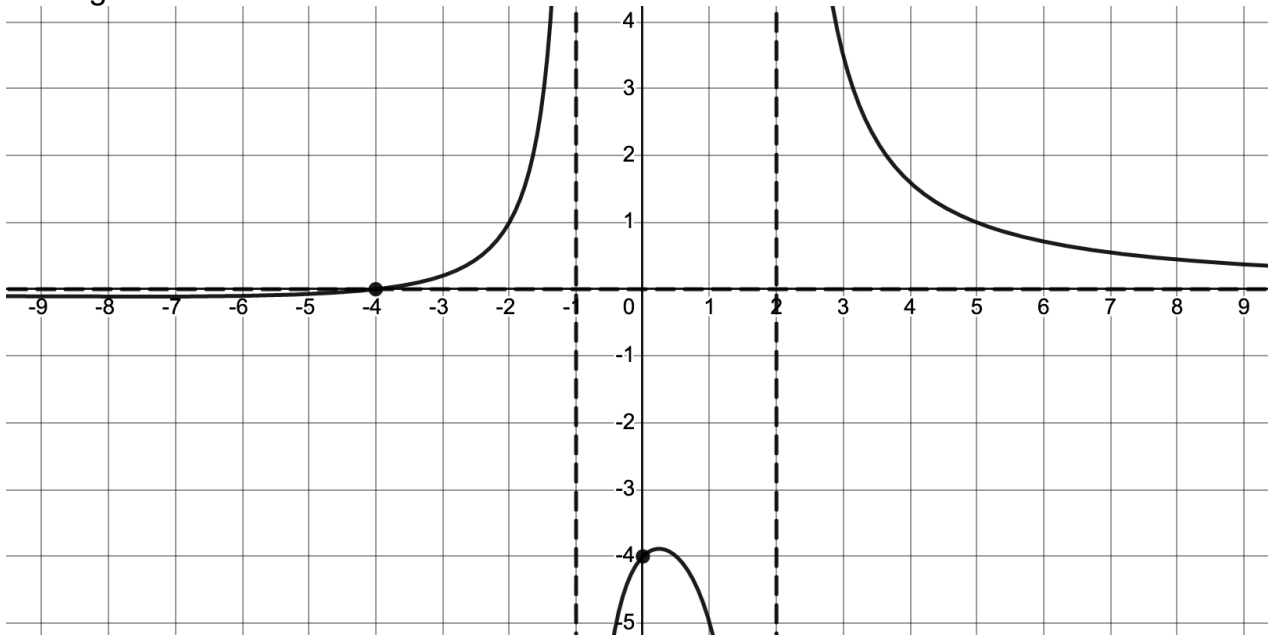   a) What will the population of the village be after 7 years?
      b) In how many years will the population double?

State the amplitude, period and phase shift. Then sketch one complete cycle of the graph, labeling all maximums, minimums, and x-intercepts.

20) $f(x) = -7\cos(5x - \pi)$

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

22) Analyze the rational function $f(x)$, which has a degree of 1 on the numerator and a degree of 2 on the denominator.

Find all intercepts, asymptotes, and the domain of f. Find a formula for the function of f.

Answers

1) $8x + 4h - 7$
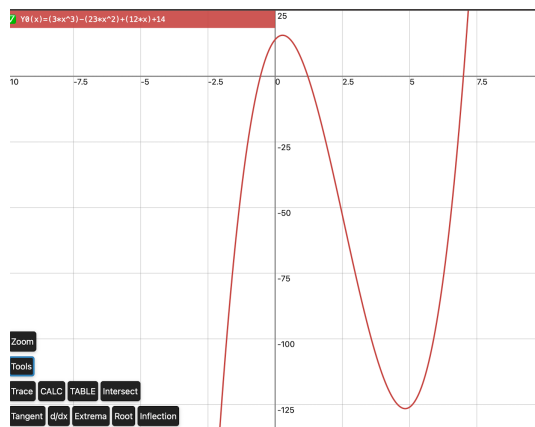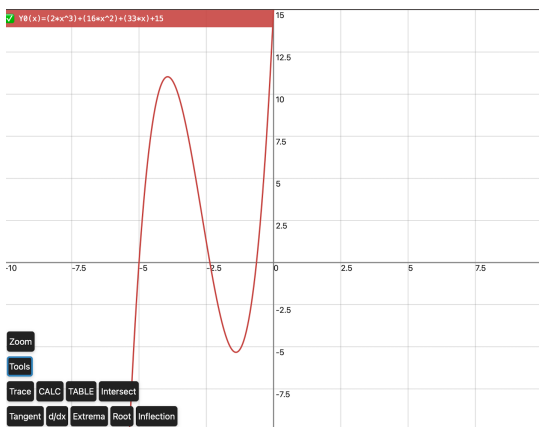
2) $4x - 5 + 2h$

3) c = 15, $x = \frac{-3\pm\sqrt{3}}{2}$

4) c = 14, $x = \frac{1\pm\sqrt{7}}{3}$

Window: xMax: 10, xMin: -10
      yMax: 15, yMin: -10

Window: xMax: 10, xMin: -10
      yMax: 25, yMin: -130

5) $(-\infty, -10] U (15, \infty)$

6) $\left(\frac{17}{25}, \frac{5}{3}\right)$

7) $-2 - 2i\sqrt{3}$

8) $\frac{99\sqrt{3}}{2} - \frac{99i}{2}$

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9) $f^{-1}(x) = \frac{8-10x}{x}$

10) $f^{-1}(x) = \frac{9x+2}{x-1}$

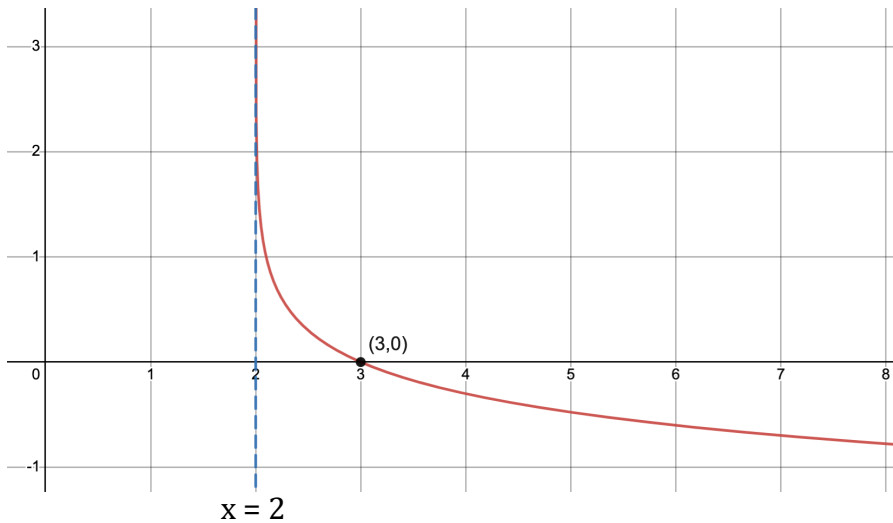11) $\|v\| = 8, \theta = 240°$

12) $\|u\| = \sqrt{338}, \theta = 315°$

13) $\pi + 2\pi n, \frac{3\pi}{2} + 2\pi n, 0 + 2\pi n$

14) $0 + 2\pi n, \pi + 2\pi n, \frac{\pi}{3} + 2\pi n, \frac{4\pi}{3} + 2\pi n$

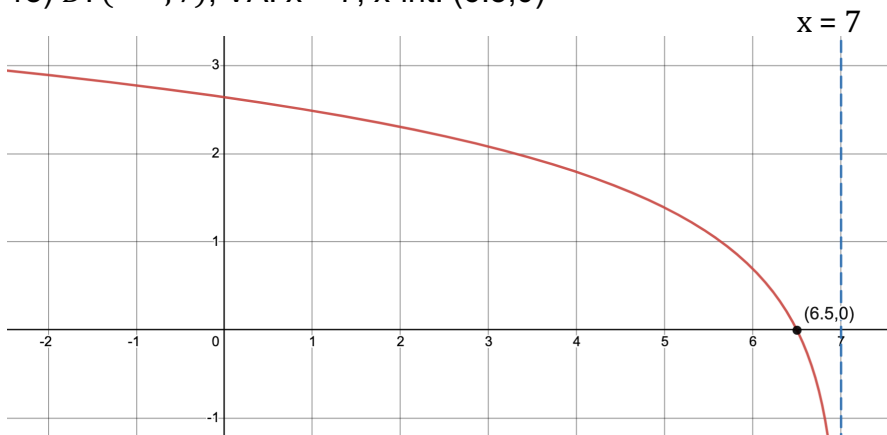15) $\frac{7}{2}u + \frac{1}{26}v$

16) $\frac{9}{2}v - 19u$

17) $D: (2, \infty)$, VA: x = 2, x-int: (3, 0)

x = 2

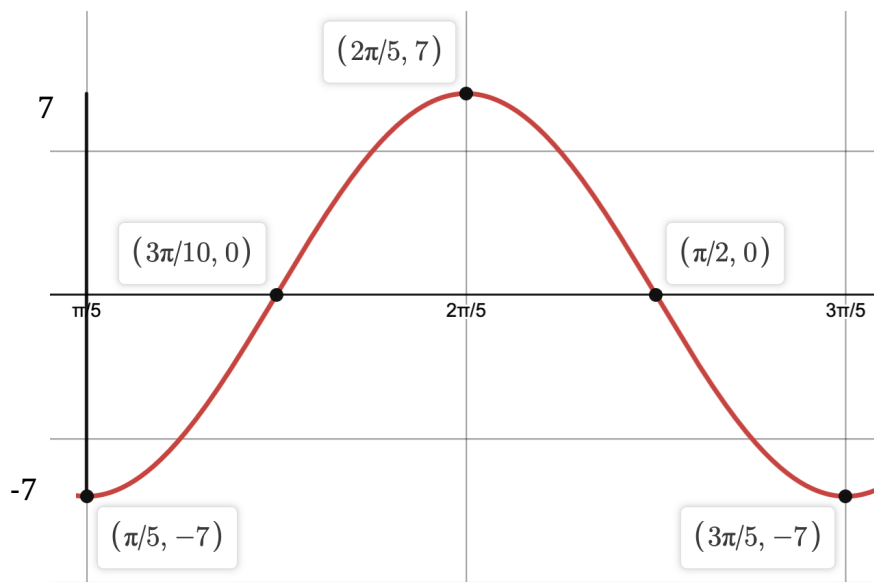18) $D: (-\infty, 7)$, VA: x = 7, x-int: (6.5,0)
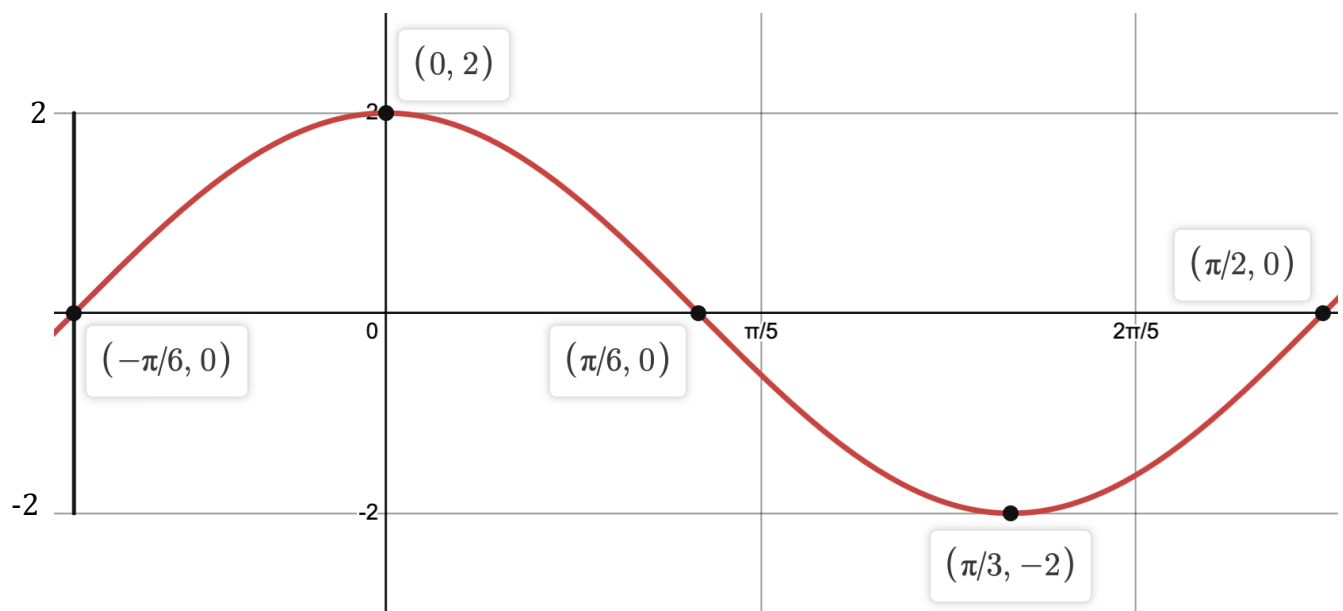

x = 7

(6.5,0)

19) a) 96.5 thousand

b) 12.3 years

20) Amp: 7, Pd: $\frac{2\pi}{5}$, PS: $\frac{\pi}{5}$ From the start, each $\frac{1}{4}$ period moves $+\frac{\pi}{10}$ units

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$(2\pi/5, 7)$

$(3\pi/10, 0)$

$(\pi/2, 0)$

$(\pi/5, -7)$

$(3\pi/5, -7)$

Min: $\left(\frac{\pi}{5}, -7\right), \left(\frac{3\pi}{5}, -7\right)$ Max: $\left(\frac{2\pi}{5}, 7\right)$ x-int: $\left(\frac{3\pi}{10}, 0\right), \left(\frac{\pi}{2}, 0\right)$

21) Amp: 2, Pd: $\frac{2\pi}{3}$, PS: $-\frac{\pi}{6}$ From the start, each $\frac{1}{4}$ period moves $+\frac{\pi}{6}$ units

$(0, 2)$

$(\pi/2, 0)$

$(-\pi/6, 0)$

$(\pi/6, 0)$

$(\pi/3, -2)$

Min: $\left(\frac{\pi}{3}, -2\right)$ Max: $(0,2)$ x-int: $\left(-\frac{\pi}{6}, 0\right), \left(\frac{\pi}{6}, 0\right), \left(\frac{\pi}{2}, 0\right)$

22) Domain: $(-\infty, -1) U (2, \infty)$ VA: $x = -1, x = 2$ HA: $y = 0$

x-intercept: $(-4, 0)$ y-intercept: $(0, -4)$

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

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