

Solutions to Semester 1 Review

① $1 = ab^2$ and $8 = ab^5$

$$\frac{1}{b^2} = a$$

$$8 = \frac{1}{b^2} \cdot b^5$$

$$8 = b^3$$

$$2 = b$$

$$1 = a(2)^2$$

$$1 = a(4)$$

$$\frac{1}{4} = a$$

$$\boxed{y = \frac{1}{4}(2)^x}$$

② $x = \frac{1}{4}(2)^y$

$$4x = 2^y$$

$$\log_2 4x = y$$

$$f^{-1}(x) = \log_2 4x$$

$$f^{-1}(5000) = \log_2(4(5000))$$

$$\boxed{f^{-1}(5000) = 14.288}$$

③ $\log_4 x = 2.7$

$$x = 4^{2.7}$$

$$\boxed{x = 42.224}$$

④ $\frac{6x + 3y}{y} = 8$

$$\frac{6x}{y} + \frac{3y}{y} = 8$$

$$\frac{6x}{y} + 3 = 8$$

$$\frac{6x}{y} = 5$$

$$\boxed{\frac{x}{y} = \frac{5}{6}}$$

⑤ $(x+3)^2 + (y-2)^2 = 16$

$$(0+3)^2 + (y-2)^2 = 16$$

$$9 + y^2 - 4y + 4 = 16$$

$$y^2 - 4y - 3 = 0$$

$$\boxed{(0, -0.646)(0, 4.646)}$$

$$(x+3)^2 + (0-2)^2 = 16$$

$$x^2 + 6x + 9 + 4 = 16$$

$$x^2 + 6x + 3 = 0$$

$$\boxed{(-5.449, 0) \text{ and } (-0.551, 0)}$$

⑥ Use calculator table and number sense.

$$\text{domain: } x \geq 2$$

$$\text{range: } y \geq 6$$

⑦ Switch x and y

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

$$x-6 = (y-2)^{\frac{1}{2}}$$

$$(x-6)^2 = y-2$$

$$(x-6)^2 + 2 = y$$

$$f^{-1}(x) = (x-6)^2 + 2$$

vertex $(6, 2)$

domain: all real #

range: $y \geq 2$

⑧ $\sqrt{6-x} - x = 6$

$$\sqrt{6-x} = 6+x$$

$$6-x = (6+x)^2$$

$$6-x = x^2 + 12x + 36$$

$$0 = x^2 + 13x + 30$$

$$0 = (x+10)(x+3)$$

$$x = -10, -3$$

$$x = -3$$

⑨ $(x-5)^2 = 45$

$$x-5 = \sqrt{45}$$

$$x = 5 \pm 3\sqrt{5}$$

⑩ $\log_3 [(x+2)(x-2)] = 2$

$$x^2 - 4 = 9$$

$$x^2 = 13$$

$$x = \pm \sqrt{13}$$

⑪ $\text{Midpt}\left(\frac{1+7}{2}, \frac{3+1}{2}\right)$

$$\text{Midpt}(4, 2)$$

the slope is $-\frac{1}{3}$

⑫ $m = 3$ b/c

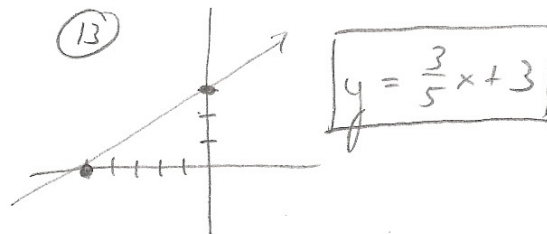
$$y - y_1 = m(x - x_1)$$

$$y - 2 = 3(x - 4)$$

$$y - 2 = 3x - 12$$

$$y = 3x - 10$$

⑬



⑭

$$x > 5 \text{ is the domain}$$

$$(15) y = a(x-5)(x+2)$$

$$20 = a(0-5)(0+2)$$

$$20 = -10a$$

$$-2 = a$$

$$y = -2(x-5)(x+2)$$

$$(16) y = 3[-2(-x-5)(-x+2)]$$

$$3 \cdot f(-x) = -6(-x-5)(-x+2)$$

x-intercepts

$$0 = -6(-x-5)(-x+2)$$

$$-x-5=0 \quad -x+2=0$$

$$-x=5 \quad -x=-2$$

$$x=-5 \quad x=2$$

$$(-5, 0)(2, 0)$$

y-intercepts

$$y = -6(0-5)(0+2)$$

$$y = -6(-5)(2)$$

$$y = 60$$

$$(0, 60)$$

$$(17) y = 100e^{0.0625(20)}$$

$$y = \$349.03$$

(18) Found -1 is a ^{Double} zero in the calculator

$$\begin{array}{r|rrrrr} -1 & 1 & 2 & -2 & -6 & -3 \\ & & -1 & -1 & 3 & 3 \\ \hline & 1 & 1 & -3 & -3 & 0 \end{array}$$

$$P(x) = (x+1)(x^3+x^2-3x-3)$$

$$\begin{array}{r|rrrr} -1 & 1 & 1 & -3 & -3 \\ & & -1 & 0 & 3 \\ \hline & 1 & 0 & -3 & 0 \end{array}$$

$$P(x) = (x+1)^2(x^2-3)$$

$$x^2-3=0$$

$$x^2=3$$

$$x = \pm\sqrt{3}$$

-1 is a double zero and $\pm\sqrt{3}$

$$(19) x < -\sqrt{3} \text{ or } x > \sqrt{3}$$

$$(20) \begin{array}{r|rrrr} -2 & 1 & -4 & -2 & 20 \\ & & -2 & 12 & -20 \\ \hline & 1 & -6 & 10 & 0 \end{array}$$

$$P(x) = (x+2)(x^2-6x+10)$$

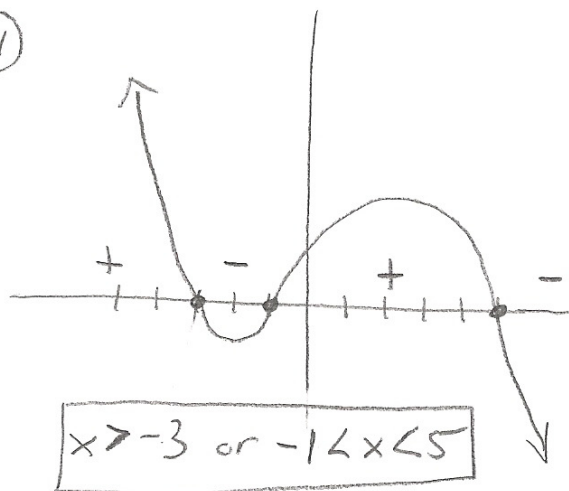
$$x = \frac{6 \pm \sqrt{36-4(1)(10)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{-4}}{2}$$

$$x = \frac{6 \pm 2i}{2}$$

$x = 3 \pm i$ and -2 are zeros

(21)



$$\begin{array}{r|rrrr} 22 & -2 & 1 & 6 & 3 & -10 \\ & & -2 & -8 & 10 & \\ \hline & & 1 & 4 & -5 & 0 \end{array}$$

$$P(x) = (x+2)(x^2+4x-5)$$

$$0 = (x+2)(x+5)(x-1)$$

$$x = -2, -5, 1$$

$$23 \quad 0 = -4.9(3.5)^2 + 0(3.5) + h_0$$

$$0 = -60.025 + h_0$$

$$60.025_m = h_0$$

$$24 \quad a \quad h(t) = -4.9t^2 + 20t + 20$$

$$b \quad t = \frac{-b}{2a} = \frac{-20}{2(-4.9)} = 2.041 \text{ sec}$$

$$c \quad 0 = -4.9t^2 + 20t + 20$$

$$t = 4.912 \text{ sec}$$

$$25 \quad \log_5 x = \log_5 x + 3$$

$$\log_5 x - \log_5 x = 3$$

$$\log_5 \frac{x}{x} = 3$$

$$\log_5 1 = 3$$

No Solution

$$26 \quad y = P(1+r)^t$$

$$2.19 = 1.99(1+r)^2$$

$$1.101 = (1+r)^2$$

$$1.049 = 1+r$$

$$0.049 = r$$

$$27 \quad y = a(x-3)(x-5)(x+3)$$

$$10 = a(0-3)(0-5)(0+3)$$

$$10 = a(45)$$

$$\frac{10}{45} = a$$

$$\frac{2}{9} = a$$

$$y = \frac{2}{9}(x-3)(x-5)(x+3)$$

$$(28) |2x-6| \leq 4$$

$$2x-6 \leq 4 \text{ and } 2x-6 \geq -4$$

$$2x \leq 10 \quad 2x \geq 2$$

$$x \leq 5 \text{ and } x \geq 1$$

$$\boxed{1 \leq x \leq 5}$$

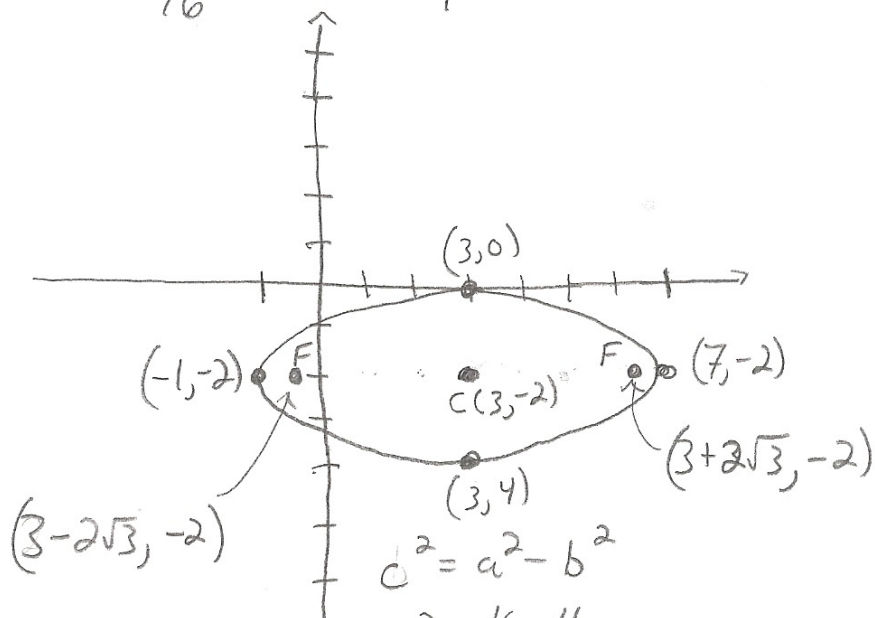


$$(29) y = 20\left(\frac{1}{2}\right)^{\frac{t}{2}}$$

$$y = 20\left(\frac{1}{2}\right)^{\frac{5}{2}}$$

$$\boxed{y = 3.536 \text{ g}}$$

$$(30) \frac{(x-3)^2}{16} + \frac{(y+2)^2}{4} = 1$$



$$c^2 = a^2 - b^2$$

$$c^2 = 16 - 4$$

$$c^2 = 12$$

$$c = \pm 2\sqrt{3}$$

$$(31) x^2 + 6x + y^2 - 8y = 11$$

$$x^2 - 2x + y^2 - 8y = 11$$

$$x^2 - 2x + 1 + y^2 - 8y + 16 = 11 + 1 + 16$$

$$(x-1)^2 + y^2 = 12$$

$$r^2 = 12$$

$$r = 2\sqrt{3}$$

