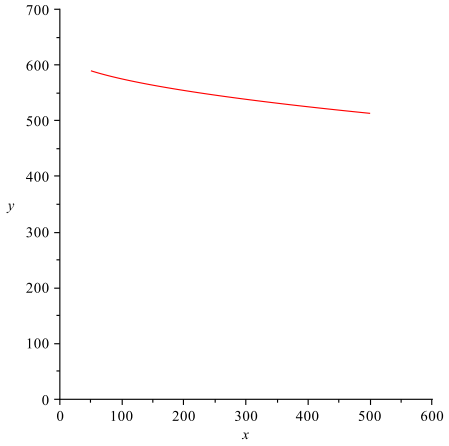
ANSWER KEY

(1) B
(2) C
(3) D
(4) C
(5) C
(6) C
(7) D
(8) A
(9) B
(10) A

(11)

(i) Graph of elementary function $y = \sqrt{x}$ gets reflected in the x-axis, vertically expanded by a factor of 5, and shifted up 625 units.

(ii) Plot of $p(x) = 625 - 5\sqrt{x}$. Note that the domain is restricted such that $x \in [50, 500]$



(12) Vertical asymptotes are found where our denominator $d(x) = 0$. Before we solve this equation, however, we must factor and cancel any like terms.

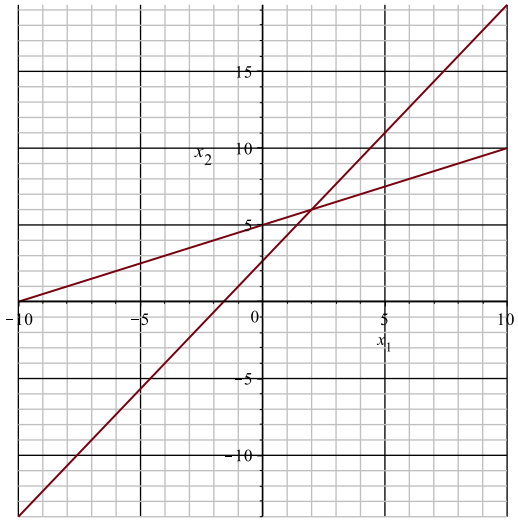
$$f(x) = \frac{x^2 + 5x}{x^2 - 4x - 45} = \frac{x(x+5)}{(x-9)(x+5)}$$
$$= \frac{x}{x-9}$$

Now we solve for where the denominator equals zero: $x - 9 = 0 \Rightarrow x = 9$

(13) Consider the linear system: $-5x_1 + 3x_2 = 8$
$3x_1 - 6x_2 = -30$

(i) As an augmented matrix: $\left[\begin{array}{cc|c} -5 & 3 & 8 \\ 3 & -6 & -30 \end{array}\right]$

(ii) (a) Graphing: Intersect at (2,6)



(b) Substitution (one possibility): From $-5x_1 + 3x_2 = 8$, solve for x_2: $x_2 = \frac{8}{3} + \frac{5}{3}x_1$
Substitute into second equation:

$$3x_1 - 6x_2 = -30 \Rightarrow 3x_1 - 6(\frac{8}{3} + \frac{5}{3}x_1) = -30$$
$$3x_1 - \frac{48}{3} - \frac{30}{3}x_1 = -30$$
$$-7x_1 - 16 = -30$$
$$x_1 = \frac{-30 + 16}{-7} = 2$$

Substitute into first equation:

$$-5x_1 + 3x_2 = 8 \Rightarrow -5(2) + 3x_2 = 8$$
$$-10 + 3x_2 = 8$$
$$x_2 = \frac{8 + 10}{3} = 6$$

(c) Elimination by Addition (one possibility):
Multiply first equation by 2: $2[-5x_1 + 3x_2 = 8] = -10x_1 + 6x_2 = 16$
Add both equations:

$$\begin{array}{rrrrrr} & -10x_1 & + & 6x_2 & = & 16 \\ + & 3x_1 & - & 6x_2 & = & -30 \\ \hline & -7x_1 & & & = & -14 \end{array}$$

$\Rightarrow x_1 = 2$
Substitute $x_1 = 2$ into either equation to find $x_2 = 6$.

(d) Augmented matrix (one possibility): $\left[\begin{array}{cc|c} -5 & 3 & 8 \\ 3 & -6 & -30 \end{array}\right]$

$3R_1 + 5R_2 \to R_2' \left[\begin{array}{cc|c} -5 & 3 & 8 \\ 0 & -21 & -126 \end{array}\right]$

$R_2 + 7R_1 \to R_1' \left[\begin{array}{cc|c} -35 & 0 & -70 \\ 0 & -21 & -126 \end{array}\right] \Rightarrow \begin{array}{rcl} -35x_1 & = & -70 \\ -21x_2 & = & -126 \end{array} \Rightarrow \begin{array}{l} x_1 = 2 \\ x_2 = 6 \end{array}$

(14) P= \$15,000, $t = 2$, $r = 0.05$, m = compounding frequency. Solve for A.

(i) If continuous compounding ($m \to \infty$):

$$\begin{aligned} A = Pe^{rt} &= 15,000e^{0.05*2} \\ &= 15,000e^{0.1} \\ &= 15,000(1.105170918) \\ &= \$16,577.56 \end{aligned}$$

(ii) If compounding quarterly ($m = 4$):

$$\begin{aligned} A = P(1 + \frac{r}{m})^{mt} &= 15,000(1 + \frac{0.05}{4})^{4*2} \\ &= 15,000(1 + 0.0125)^8 \\ &= 15,000(1.104486101) \\ &= \$16,567.29 \end{aligned}$$

GRADING SCALE

Raw Score	Final Score
31.5	102.25
29	98.5
28	97
27	95.5
26.5	94.75
25.5	93.25
25	92.5
24.5	91.75
22.5	88.75
22	88
21	86.5
20.5	85.75
20	85
19.5	84.25
19	83.5
18	82
17	80.5
16	79
15.5	78.25
15	77.5
14.5	76.75
13	74.5
11	71.5
10.5	70.75
6	64
0	0