1. Solve for $y$: \( \frac{2}{3} y + \frac{1}{2} (y-3) = \frac{y+1}{4} \)
   a.) \(-\frac{15}{11}\)
   b.) \(6/5\)
   c.) \(21/11\)
   d.) \(60/13\)
   e.) None of the above

2. Solve for $r$: \( A=P+Prt \)
   a.) \(\frac{A-P}{Pt}\)
   b.) \(\frac{A-P}{P+t}\)
   c.) \(\frac{A+P}{Pt}\)
   d.) \(\frac{A}{P+Pt}\)
   e.) \(A-P-Pt\)

3. Solve for $x$: \( \sqrt{x+6} - x = 4 \)
   a.) 5 and 2 only
   b.) 2 only
   c.) \(-2\) only
   d.) \(-5\) and \(-2\) only
   e.) None of the above

4. Solve for $x$: \( x^4 - 6x^2 + 5 = 0 \)
   a.) \(\pm 1\) and \(\pm 5\)
   b.) 2 and 3
   c.) \(-2\) and \(-3\)
   d.) \(\pm 1\) and \(\pm \sqrt{5}\)
   e.) None of the above

\[ 8y+6y-3y = 3+18 \]
\[ 11y = 21 \quad \Rightarrow \quad y = \frac{21}{11} \]
5. The solution of \(2(4x + 3) \geq 8 - 4(x - 1)\) is:
   a.) \(x \leq -1/2\)
   b.) \(x \geq 3/2\)
   c.) \(x \leq -2/3\)
   d.) \(x \geq 1/2\)
   e.) None of the above

6. For what values of \(x\) is \(\frac{8 - 3x}{-4} \geq 3\)?
   a) \((-\infty, -\frac{4}{3}] \cup [\frac{4}{3}, \infty)\)
   b) \([-\frac{4}{3}, \frac{20}{3}]\)
   c) \([-\frac{4}{3}, \infty)\)
   d) \((-\infty, -\frac{4}{3}] \cup [\frac{20}{3}, \infty)\)
   e) \([\frac{20}{3}, \infty)\)

7. If \(f(x) = 2x - 3\), then \(\frac{f(x+h) - f(x)}{h}\)
   a) \(2x + h - 3\)
   b) \(2\)
   c) \(1\)
   d) \(0\)
   e) \(2h\)

8. If \(f(x) = \frac{x}{2x^2 - 4x}\) and \(g(x) = \begin{cases} x - 4, & x < 2 \\ x^2, & x \geq 2 \end{cases}\) (2 points each)
   a.) What is the domain of \(f(x)\)? \((-\infty, 0) \cup (0, 2) \cup (2, \infty)\)
   b.) Evaluate \(f(-1)\):
   c.) What is the domain of \(g(x)\)? \((-\infty, 2) \cup (2, \infty)\)
   d.) Evaluate \(g(-1)\):

9. Give an example of a 3rd degree polynomial function: (2 points)

10. State the domain of the function \(f(x) = \sqrt{x - 1}\): (2 points) \([1, \infty)\)
11. In the problems below, establish an appropriate equation or inequality and solve. You will not receive credit for a trial and error solution. (a: 7 points, b: 5 points)

a.) A company produces figurines at a cost of $3.00 per unit. If fixed costs are $1,500 per month and each unit sells for $8, how many figurines must be sold in a given month to break even?

\[ 8x = 3x + 1500 \]
\[ 8x - (3x + 1500) = 6500 \]
\[ 5x = 5000 \]
\[ x = 1000 \]

b.) A fence is to be placed around a rectangular plot so that the enclosed area is 800 ft² and the length of the plot is twice the width. What are the dimensions of the plot? How many feet of fencing must be used?

Dimensions: \[ 80 = w \quad 40 = l \]

Fencing needed: \[ 2(40) + 2(20) = ? \]

12. If \( f(x) = x^2 - x \) and \( g(x) = 2x \), find the following: (2 points each)

a.) \( (f + g)(x): \quad \frac{x^2 + x}{2x} \)

b.) \( (f - g)(x): \quad \frac{x^2 - 2x}{2x} \)

c.) \( (f - g)(4): \quad \frac{4}{2} \)

d.) \( (fg)(x): \quad \frac{(x^2 - x)(2x)}{2x^2 - 2x} \)

e.) \( \frac{f}{g}(x): \quad \frac{x(x - 1)}{2x} \)

f.) \( (f \cdot g)(x): \quad \frac{4x^2 - 2x}{2x} \)

g.) \( (g \circ f)(-4): \quad 40 \)

h.) Identify the domain in part e above: \( (-\infty, 0) \cup (0, \infty) \)

13. Find the inverse function of \( f(x) = 3x + 5 \). Show all steps. (4 points)

\( y = 3x + 5 \) switch Domain & Range Values

\( x = 3y + 5 \) solve for \( y \)

\( \frac{x - 5}{3} = y \) change notation to \( f^{-1} \)
14. Identify any $x$ axis, $y$ axis or origin symmetry in the relation $5x^2 - 2xy + y^2 = 0$. Show all appropriate steps. (5 points)

\[ 5(-x)^2 - 2(-x)(-y) + (-y)^2 = 0 \]
\[ 5x^2 - xy + y^2 = 0 \]
Same as original eq.

\[ 5(-x)^2 - 2(-x)y + y^2 \Rightarrow \text{no symmetry} \]
\[ 5x^2 - 2x(-y) + (y)^2 \Rightarrow \text{no symmetry} \]

15. Sketch the graph of $4x^2 + y^2 = 16$, using $x$ and $y$ intercepts and results of symmetry tests. (6 points)

Identify:
- $x$ intercept(s): \((2,0), (2,0)\), let $y = 0$
- $y$ intercept(s): \((0,-4), (0,4)\), let $x = 0$

Any $x$ axis, $y$ axis or origin symmetry:
- Symmetric to all three
- $x$ axis
- $y$ axis
- Origin

\[ 4(x)^2 + (y)^2 = 16 \text{ no change} \]
\[ 4(x)^2 + y^2 = 16 \text{ no change} \]
\[ 4(x^2 + (-y)^2) = 16 \text{ no change} \]

16. In the blank to the left of each function listed in Column A, place the number of the graph in Column B that represents that function. Each item in Column B may be used once, more than once or not at all. (2 points each)

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.) $y = f(x) =</td>
<td>x - 1</td>
</tr>
<tr>
<td>b.) $y = f(x) = 2x + 1 $</td>
<td></td>
</tr>
<tr>
<td>c.) $y = f(x) = \sqrt{x - 1} $</td>
<td></td>
</tr>
<tr>
<td>d.) $y = f(x) = \frac{1}{x} $</td>
<td></td>
</tr>
<tr>
<td>e.) $y = f(x) = 3x - 1 $</td>
<td></td>
</tr>
</tbody>
</table>