

Accelerated Geom/Alg 2
Final Exam Review

Name _____
Date _____ Block _____

Perform the indicated operation.

1. $(-7x^3 + 9x^2 - 4x + 3) + (10x^3 + 4x^2 - 8x - 9)$

1. _____

2. $(5x^3 - 9x + 1) - (-2x^3 + 2x^2 - 10x + 11) - (5x - 9)$

2. _____

3. $(x^2 + 9x - 12)(7x + 4)$

3. _____

4. Factor completely: $4x^4 - 76x^3 - 480x^2$

4. _____

5. Factor completely: $8x^2 - 14x - 15$

5. _____

6. a) Expand the following: $(2x - 9)^4$

6a. _____

b) Express $(2x - 9)^4 + (2x + 9)^4$ as the sum of three terms.

6b. _____

7. a) Find the x^4 **term** in the expansion of $(x - 5)^{10}$.

7a. _____

b) Hence, find the x^5 **term** in the expansion of $7x(x - 5)^{10}$.

7b. _____

8. Find the **coefficient** containing x^{14} in the expansion of $(3 + 4x^2)^9$

8. _____

9. Given that $(5 - \sqrt{3})^3 = a + b\sqrt{3}$ where a and b are integers,
find a and b .

9. $a =$ _____

$b =$ _____

10. Use synthetic division to divide the following:

10. _____

$$6x^4 - 3x^2 - 14 \div x + 2$$

11. Use the completed synthetic division to write the original rational function in the form $\frac{a(x)}{b(x)}$ as well as the
"new" form $q(x) + \frac{r(x)}{b(x)}$.

$$\begin{array}{r|rrrr} -4 & 1 & 2 & 3 & 2 \\ & & -4 & 8 & -44 \\ \hline & 1 & -2 & 11 & -42 \end{array}$$

$$\frac{a(x)}{b(x)} = \underline{\hspace{2cm}}$$

$$q(x) + \frac{r(x)}{b(x)} = \underline{\hspace{2cm}}$$

12. Use long division to divide the following:

12. _____

$$y^4 + 2y^2 - y + 5 \div y^2 - y + 1$$

Find the inverse of the following functions. **Make sure you use proper notation.**

13. $m(x) = 5(x - 7)$

13. _____

14. $p(x) = -3\sqrt{x - 4} + 1$

14. _____

If $f(x) = x^2 - 3x + 4$ and $g(x) = 4x - 7$, find:

15. $f(g(x))$

15. _____

16. $(g \circ g)(x)$

16. _____

17. Verify that $p(x) = 5(x - 3)$ and $r(x) = \frac{x}{5} + 3$ are inverse functions **by compositions**.

Use your identities to factor/expand #1-6.

18. $27x^3 - 64y^3$

18. _____

19. $49 + 121x^2$

19. _____

20. $(2x - 9)^2$

20. _____

21. $(x + 4y)^3$

21. _____

22. $256 - 289x^2$

22. _____

23. $8x^3 + 343$

23. _____

24. $(x + 4)^2$

24. _____

25. $(3 - x)^3$

25. _____

Solve for all of the zeroes for the following polynomials. You must show the process for finding the zeroes.

26. $x^4 + 3x^3 - x^2 + 27x - 90 = 0$

Factored Form: _____

Roots: _____

27. $g(x) = 2x^5 + 5x^4 - 7x^3 - 11x^2 + 13x - 2$

Factored Form: _____

Roots: _____

28. What are all of the possible rational roots for $f(x) = 3x^4 - 7x + 48$?

11. _____

29. Write a **function** (use proper notation) in factored form, given the following roots: $3i, 5i, 2, -1$.

Identify the following for each of the polynomials given.

30. $y = -4x^4 - 2x^2 + 7$

Degree of polynomial: _____ Name by the degree of the polynomial: _____

of terms: _____ Name by the number of terms: _____

Leading coefficient: _____ Maximum number of zeroes: _____

Symmetry of the polynomial: _____

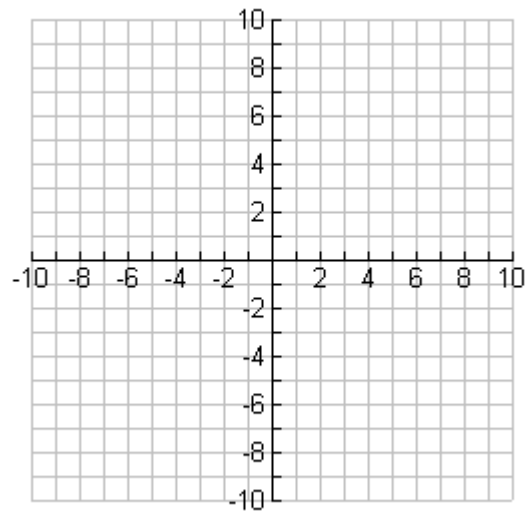
End behavior: $as\ x \rightarrow -\infty, f(x) \rightarrow$ _____
 $as\ x \rightarrow \infty, f(x) \rightarrow$ _____

31. Sketch the graph of the polynomial function with the following characteristics:

Zeroes: 3, 0, -4, -8

Intervals of increase: $(-6, -2), (1, \infty)$

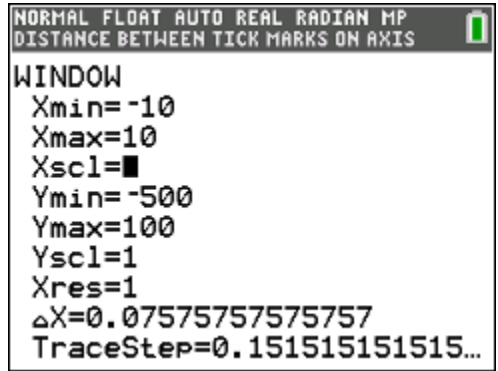
Intervals of decrease: $(-\infty, -6), (-2, 1)$



32. Write the equation of the function that is a quintic binomial with odd symmetry and whose end behavior rises to the left and falls to the right.

33. For $h(x) = x^4 + 2x^3 - 36x^2 - 2x + 35$, use your calculator to state the following:

Set your **windows** to look like:



Zeros: _____

Type of Symmetry: _____

Relative Maximum(s): _____

Relative Minimum(s): _____

Absolute Max/Min: _____

Domain: _____ Range: _____

Intervals of increase: _____

Intervals of decrease: _____

End behavior: $x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

Solve the following radical equations.

34. $\sqrt{21y-3} = 2y+1$ $y =$ _____

35. $-4 = \sqrt[3]{5x+1}$ $x =$ _____

36. $\sqrt[3]{3m-2} = \sqrt[3]{33-4m}$ $m =$ _____

37. $\sqrt{a-2}+8=3$

$a =$ _____

38. $\sqrt{4x+5}=-x$

$x =$ _____

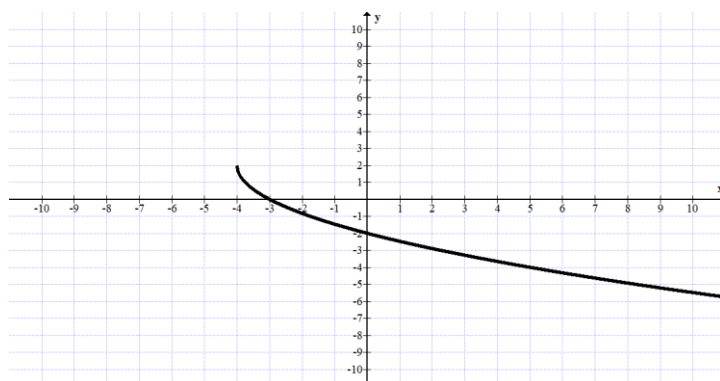
For each question below, place the letter of the correct answer on the line beside the number.

___ 39. Which transformations are being applied to the parent function in the equation:

$$j(x) = -4\sqrt[3]{x-2}$$

- a) Reflection over the x-axis, vertical stretch, horizontal shift left
- b) Reflection over the x-axis, vertical shrink, horizontal shift right
- c) Reflection over the x-axis, vertical stretch, horizontal shift right
- d) Vertical shrink, horizontal shift left, vertical shift down

Based on the graph of $m(x)$ to the below, answer the following questions.



40. The domain of $m(x)$ is:

- a) $[-3, \infty)$
- b) $[-4, \infty)$
- c) $[-2, \infty)$
- d) $(-\infty, \infty)$

41. The range of $m(x)$ is:

a) $(-\infty, \infty)$

b) $[-4, \infty)$

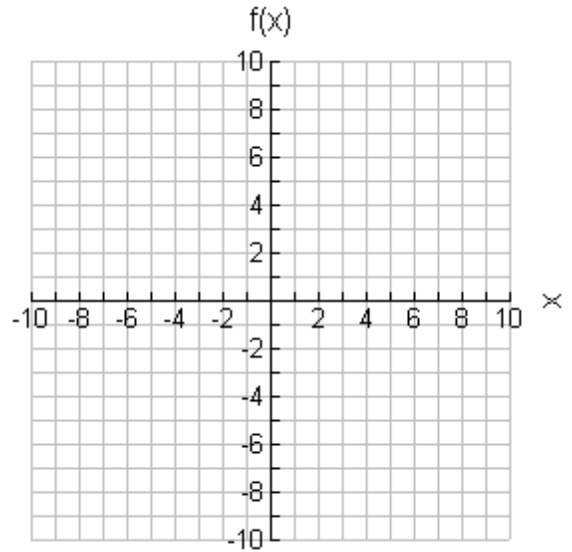
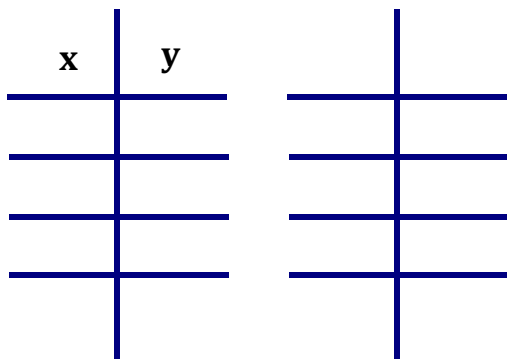
c) $[2, \infty)$

d) $(-\infty, 2]$

Graph the following functions.

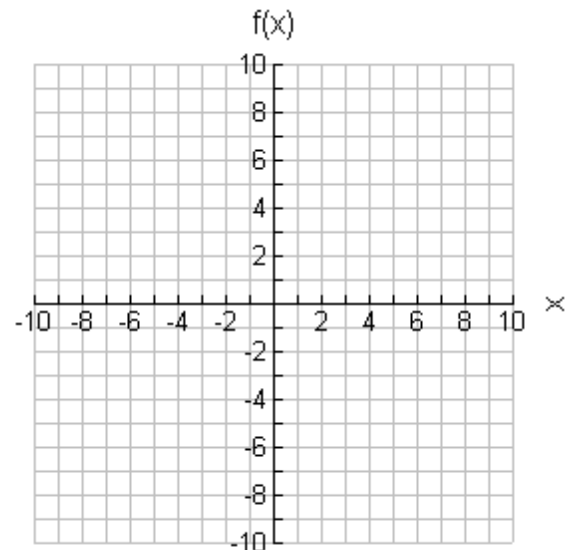
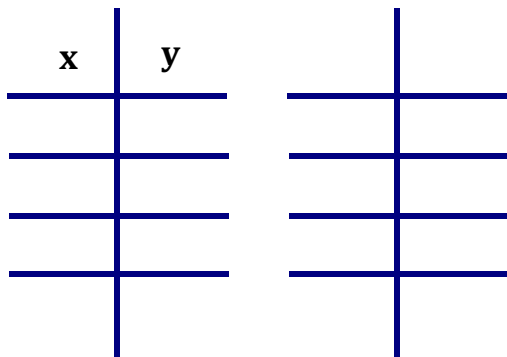
42. $f(x) = 2\sqrt{x+1} - 6$

Transformations: _____

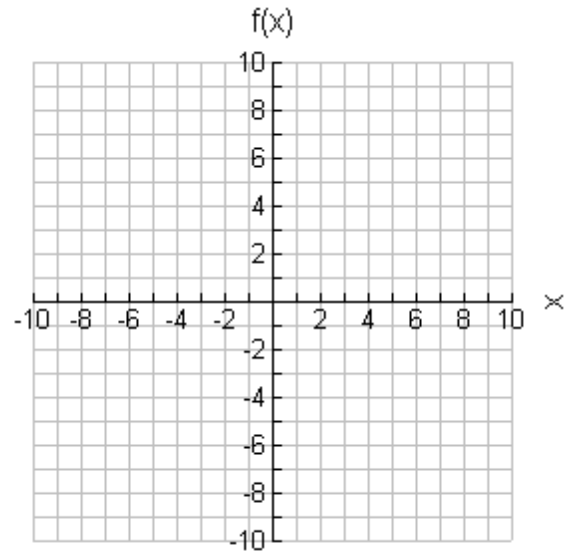


43. $f(x) = -\frac{1}{2}\sqrt[3]{x-2}$

Transformations: _____



$$44. f(x) = \begin{cases} x-1 & x \leq -2 \\ 2x-1 & -2 < x \leq 4 \\ -3x+8 & x > 4 \end{cases}$$



Continuous or Discontinuous

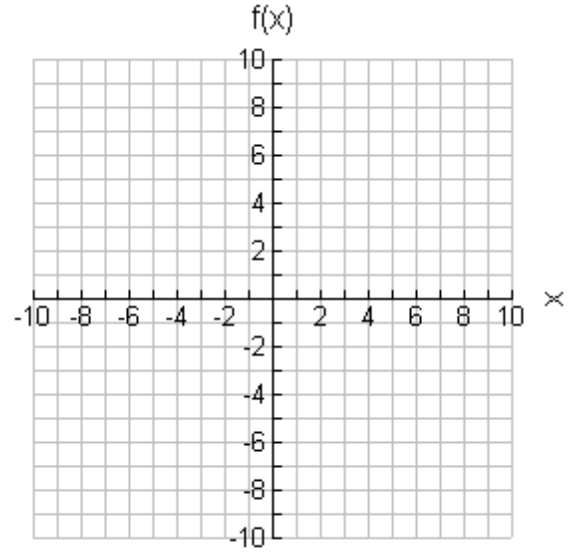
Evaluate:

$f(3) = \underline{\hspace{2cm}}$

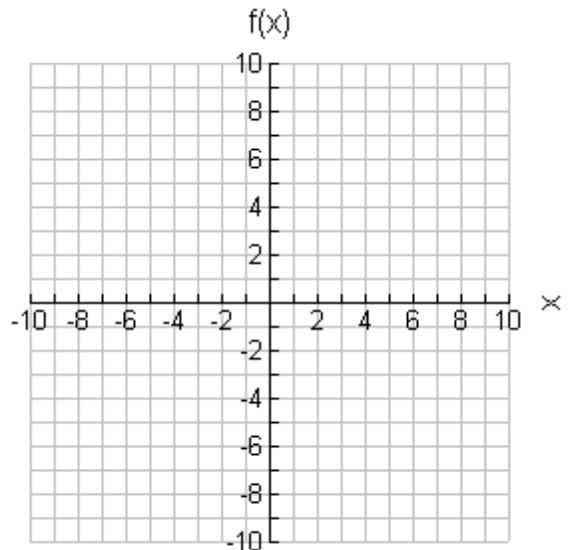
$f(-10) = \underline{\hspace{2cm}}$

$f(10) = \underline{\hspace{2cm}}$

$$45. f(x) = \begin{cases} -2 & x < -6 \\ 1 & -6 \leq x < -3 \\ 3 & -3 \leq x < 0 \\ 6 & 0 \leq x \leq 5 \end{cases}$$



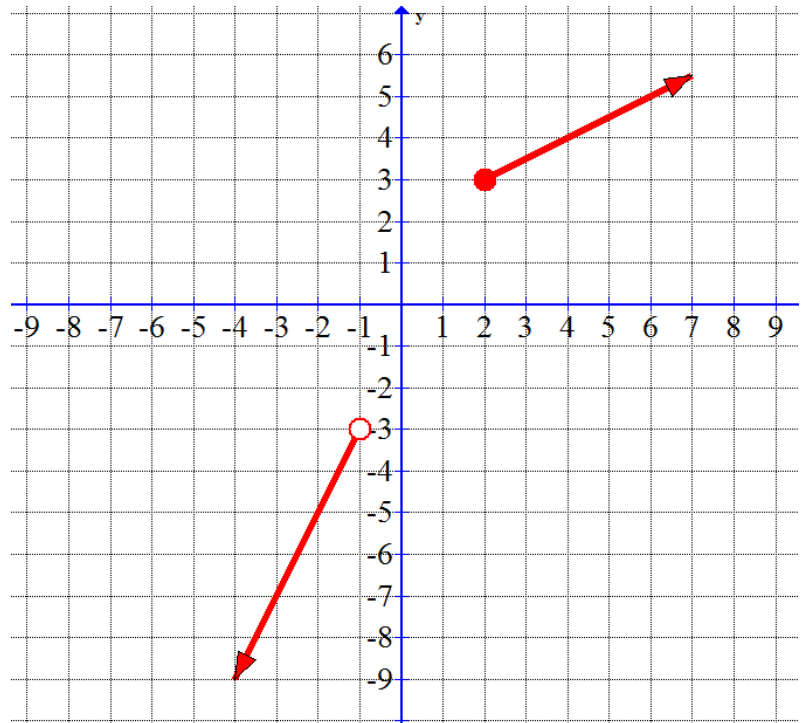
$$46. h(x) = \begin{cases} x-6 & x > 4 \\ 2(x-3)^2 - 4 & 2 \leq x \leq 4 \\ -2 & x < 2 \end{cases}$$



Continuous or Discontinuous

47. Write the piecewise function for the following graph.

$f(x) =$ _____ (3)



Simplify.

$$48. \frac{x^3 + 64}{x^2 - 16}$$

48. _____

$$49. \frac{x^4}{16y^2} \cdot \frac{-8x^3y}{36x^5y^9}$$

49. _____

$$50. \frac{2x^3 - 12x^2}{x^2 - 4x - 12} \div \frac{8x^3 + 24x^2}{x^2 + 9x + 18}$$

50. _____

$$51. x^3 + 10x^2 \div \frac{x^2 - 9}{x + 3} \cdot \frac{x^2 - 7x + 12}{x + 10}$$

51. _____

$$52. \frac{5x^2 - 8x}{x^2 - 9} - \frac{4x + 9x^2}{x^2 - 9}$$

52. _____

$$53. \frac{6v}{v+5} + \frac{5v}{v-5}$$

53. _____

$$54. \frac{\left(\frac{1}{3x} - \frac{4}{x+2}\right)}{\left(\frac{x^2+2x-3}{x^2+2x}\right)}$$

54. _____

Solve and check for extraneous solutions.

$$55. \frac{6+5x}{3x} = \frac{7}{x}$$

55. _____

$$56. \frac{15}{x} = \frac{6}{x} + 2$$

56. _____

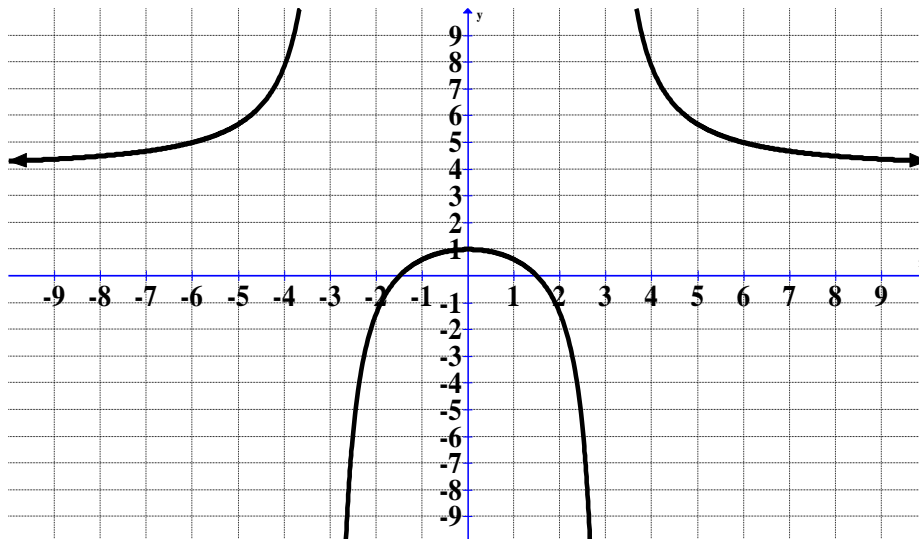
$$57. \frac{1}{x-2} + \frac{1}{x+3} = \frac{5}{x^2+x-6}$$

57. _____

$$58. \frac{3x}{x+1} = \frac{12}{x^2-1} + 2$$

58. _____

59. Given the graph, identify the following characteristics. If none exists for a specific characteristic, write "none".



- a. Vertical Asymptote(s): _____
- b. Domain: _____
- c. Zero(s): _____
- d. Y Intercept: _____
- e. Horizontal Asymptote: _____

60. For the given function, $f(x) = \frac{4x^2}{x^2 - 5x + 4}$, state the following:

Vertical Asymptote: _____ Domain: _____

Horizontal Asymptote: _____

Zeroes: _____ y-intercept: _____

61. For the function $h(x) = \frac{x+1}{x^2-4}$, graph and state the following:

Vertical Asymptote: _____

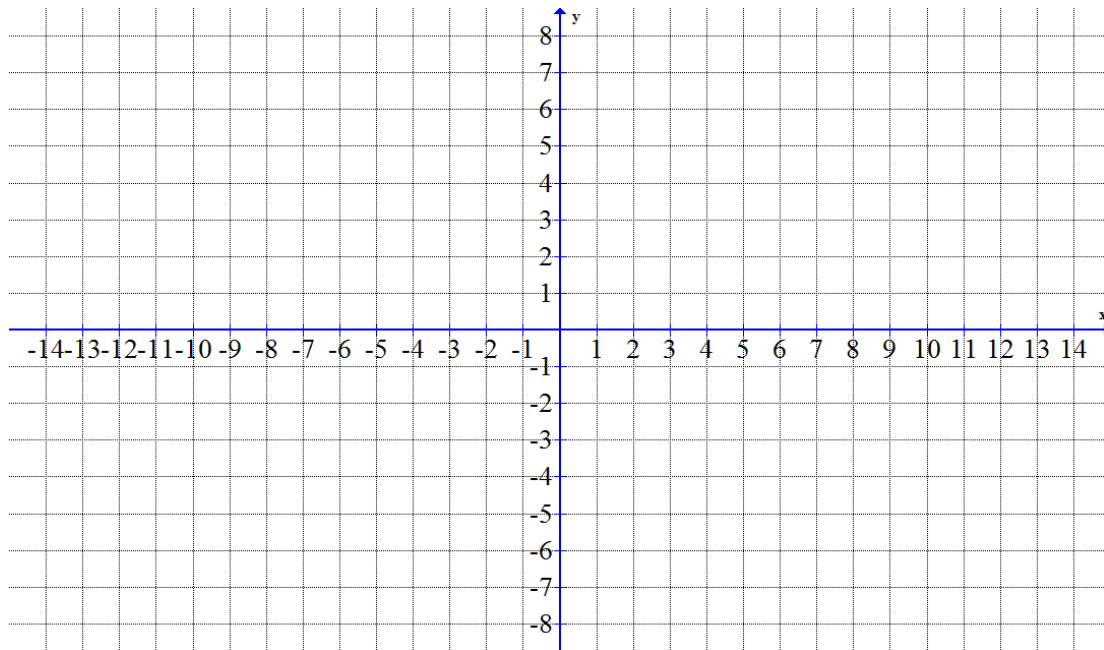
Domain: _____

Horizontal Asymptote: _____

Zeroes: _____

y-int: _____

End Behavior: $x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____



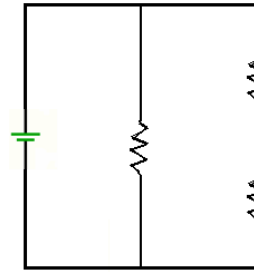
62. Determine if there are any holes in the graph of the function $g(x) = \frac{x^2-4}{x^2-3x+2}$. If so, what are they?

Holes: _____

63. Find the slant asymptote for the following function: $h(x) = \frac{x^2+5}{x-1}$.

SA: _____

64. There are two resistors in series: the second has twice the resistance of the first one. The parallel resistor has a resistance that is 1 ohm more than the first in series. The entire circuit has a resistance of 2 ohms. Find the strength of each resistor.



R = _____ R = _____ R = _____

65. Working together, Mike and Will can set up the chairs for graduation in 2 hours. Will works 4 times as fast as Mike. How long would it take each of them to complete the job, working alone?

Will = _____

Mike = _____