Enclosed are informal assessment tests to help place your child at the appropriate course level:

- a two-part reading test;
- a spelling test;
- an English grammar test; and
- a mathematics test.

Please read through the instructions for each assessment test thoroughly before administering. When you’ve completed all the assessments, please return all materials.

You will receive a written evaluation of the assessment tests with recommendations for a course of study and book choices.

Please contact the Kolbe office with any questions.
Placement Test Proctor Instructions

GRADE LEVEL: The assessment tests are end-of-the-year cumulative tests. The student will probably be taking assessment tests for the end of the grade level just completed. Please make sure that all tests that you have been sent are for the proper level.

ASSISTANCE: The assessment tests are intended to show the student’s current level of attainment. Accordingly, it is important that the student receive no assistance with the test. Please refrain from answering questions about the content of the tests until after the testing period.

ASSESSMENT SEGMENTS:

A. READING ASSESSMENT
   1. Have the student read the "Student Passage" silently.
   2. The student should then read the passage aloud while the person administering the test makes notations on the “Teacher Passage” sheet. See Appendix A for the notations to be made and the marks to use. Mark comprehension questions "C" for correct and "X" for incorrect.

B. SPELLING ASSESSMENT
   This segment requires the person administering the test to dictate the words, with the student writing each one as it is dictated. While dictating, repeat each word no more than twice.

C. ENGLISH GRAMMAR AND MATHEMATICS ASSESSMENTS
   1. Both of these assessments are non-assisted segments, with the exception of the Primer and End-of-First Grade Assessments, which are presented orally. The student may take as much time as is necessary to complete each segment.
   2. Please do not have the student type the written essay. Handwriting is being evaluated as well!

If returning to Kolbe for scoring: Please return all materials, making a copy for your records.
### Word-Recognition Miscue-Marking System

<table>
<thead>
<tr>
<th>Miscue</th>
<th>Marking</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mispronunciation</td>
<td>went</td>
<td>The student attempts to pronounce the word but produces a non-sense word, rather than a real one.</td>
</tr>
<tr>
<td>Substitution</td>
<td>went</td>
<td>The student substitutes a real word that is incorrect.</td>
</tr>
<tr>
<td>Refusal to pronounce</td>
<td>went</td>
<td>The student neither pronounces the word nor attempts to do so.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The teacher supplies the word so that testing can continue.</td>
</tr>
<tr>
<td>Insertion</td>
<td>sent to</td>
<td>The student inserts a word that does not appear in the text.</td>
</tr>
<tr>
<td>Omission</td>
<td>to the school</td>
<td>The student omits a word in the text but continues to read.</td>
</tr>
<tr>
<td>Repetition</td>
<td>in the little house</td>
<td>The student repeats one or more words that have been read.</td>
</tr>
<tr>
<td>Reversal</td>
<td>that he saw</td>
<td>The student reverses the order of words or letters.</td>
</tr>
</tbody>
</table>

Note: If the student makes a miscue and then corrects it without prompting from the teacher, the teacher should place a check (✓) beside the miscue to indicate a spontaneous correction and not include the miscue in the error count.
END OF TENTH GRADE ASSESSMENT

CUMULATIVE

1. Reading Assessment, Part One: Teacher Passage

2. Reading Assessment, Part Two: Teacher List

3. Spelling Assessment: Teacher List

4. English Grammar Assessment Answer Key

5. Math Assessment Answer Key

________________________________________________________________________

Student’s Name          Date

(EO10G: Teacher)
INTRODUCTORY STATEMENT: Read this story to find out about a woman who became a famous pilot—Amelia Earhart.

Earhart was away a lot, in his work as a claims agent, and sometimes he took his wife along with him. The result was that Amelia and her younger sister Muriel spent much of their childhood living with their grandparents. Amelia had a rich fantasy life, and lived adventurous summers exploring caves, playing baseball with equipment given to her by her father, reading Scott, Dickens, George Eliot; but she must have learned early on that she was essentially alone.

"I was a horrid little girl," she said later. "Perhaps the fact that I was exceedingly fond of reading made me endurable. With a large library to browse in, I spent many hours not bothering anyone after I once learned to read."

The family moved to Des Moines in 1907, apparently to escape the domination of the grandparents, and on her tenth birthday, Amelia saw her first airplane. That day, her father took her to the Iowa State Fair; it was only five years after the Wright Brothers had first flown at Kitty Hawk (incidentally, with money provided by a Wright sister) and airplanes were a great curiosity. Amelia, however, was not impressed.

Source: Reprinted from Ms Magazine with the permission of the author.

<table>
<thead>
<tr>
<th>COMPREHENSION QUESTIONS</th>
<th>1. What is the purpose of this story? (to describe Amelia Earhart's early life and what she was like)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. What was Amelia's father's occupation? (claims agent)</td>
<td></td>
</tr>
<tr>
<td>3. Why did Amelia and her younger sister spend much of their childhood living with their grandparents? (Her father sometimes took her mother with him in his travels as a claims agent.)</td>
<td></td>
</tr>
<tr>
<td>4. Did Amelia have a good imagination? (yes) What did the story say that made you believe that? (She had a rich fantasy life.)</td>
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<tr>
<td>5. What kind of equipment did Amelia's father give her? (baseball equipment)</td>
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<tr>
<td>6. What does the term &quot;endurable&quot; mean? (bearable; tolerable)</td>
<td></td>
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<tr>
<td>7. Why did the family move to Des Moines in 1907? (apparently to escape the domination of the grandparents)</td>
<td></td>
</tr>
<tr>
<td>8. What happened five years after the Wright Brothers first flew at Kitty Hawk? (Amelia saw her first airplane at the Iowa State Fair; Amelia’s father took her to the Iowa State Fair) If the second response is given, ask “What happened there?” Students should respond, “She saw her first airplane.”</td>
<td></td>
</tr>
<tr>
<td>9. Who supplied the money for the Wright Brothers’ first flight? (a Wright sister)</td>
<td></td>
</tr>
<tr>
<td>10. How did Amelia feel about the first airplane she saw? (She was not impressed.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCORING AID</th>
<th>WORD RECOGNITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>inferrence</td>
<td>cause and effect/inference</td>
</tr>
<tr>
<td>COMPREHENSION</td>
<td>vocabulary</td>
</tr>
<tr>
<td>inferrence</td>
<td>cause and effect/detail</td>
</tr>
<tr>
<td>detail</td>
<td>sequence</td>
</tr>
<tr>
<td>192 WORDS (for Word Recognition)</td>
<td></td>
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<tr>
<td>192 WORDS (for Rate)</td>
<td></td>
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<tr>
<td>WPM</td>
<td>11520</td>
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<tr>
<td>detail</td>
<td></td>
</tr>
<tr>
<td>0-2 Errors—Independent Level</td>
<td>3-4 Errors—Instructional Level</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>1. Then</td>
<td>2. Volta</td>
</tr>
<tr>
<td>15. Watt</td>
<td>16. Watt</td>
</tr>
</tbody>
</table>
Directions: Read each word slowly to the student. Have the student write the dictated word on the answer sheet provided.

1. transition
2. utilize
3. vaudeville
4. vicinity
5. wince
6. appraisal
7. arsenal
8. coincide
9. defiant
10. duplicate
11. elaborate
12. feasible
13. intent
14. intrigue
15. meditate
16. morass
17. mutual
18. panorama
19. perpetual
20. retrieve
21. subterranean
22. synthetic
23. vehemence
24. virtual
25. zealous
26. arthritis
27. bereave
28. chronological
29. cryptic
30. docile
ENGLISH GRAMMAR ASSESSMENT  
(EO10G)

I. Rewrite: Make the necessary corrections. Subtract one point for each individual error.

1. "You must," said the teacher, "describe the motion of the earth as well as you are able." 9 points

2. Richard, where have you laid my hat, coat, and gloves? 6 points

3. John didn't have any money to give him and me for the show. 7 points

4. The teacher said, "Give synonyms for the following words: aim, alike, change, courageous, do, fiction, faithful." 13 points

5. History, religion, mathematics, English, and literature are really the most important subjects in the field of high school education. 7 points

6. How differently I felt after Mr. Jeffrey told me what had happened. He said, "John, you know the money that was taken?" "Yes," I said. "Well, don't worry, we found it." 26 points

7. The book All Quiet on the Western Front is a masterpiece of understanding, and at portraying human emotions during wartime. The book All Quiet on the Western Front is a masterpiece in its understanding and portrayal of human emotions during wartime. 9 points

II. Diagram the following sentences and name the part of speech of each word.

1. Everybody-pronoun talks-verb about-preposition the-article/adjective weather-noun but-conjunction nobody-pronoun does-verb anything-pronoun about-preposition it-pronoun

   Everybody — talks — about — weather — but — nobody — does — anything — about — it

   11 points for naming + 11 points for diagramming = 22 pts. total
2. I-pronoun was looking-verb for-preposition the-article/adjective blueprints-noun when-adverb I-pronoun found-verb that-pronoun on-preposition the-article/adjective floor-noun

I was looking for blueprints

I found that

12 points for naming + 12 points for diagramming = 24 pts. total

123 points total. Subtract 0.8 point from 100 for each error to calculate the final percentage, or divide the total number of points earned by 123, and translate to a percentage.

III. The purpose of this section is for you to gauge the student's strengths and weaknesses in composition writing. Evaluate the content (introduction, thesis statement, conclusion, ideas-do they relate in each paragraph and support the thesis statement?) and the composition (grammar/spelling errors, sentence structure, etc.)
ANSWER KEY
MATH ASSESSMENT
EOG10

Part I & Part II of a EOG 10 Math Assessment is provided. It is recommended that a student take either Part I OR Part II of the test, not both. Either part taken on its own will assess the student's mastery. Some students may take the challenge of completing both parts, but it is not necessary for assessment.

Use Scale EZ grader

<table>
<thead>
<tr>
<th>Part I</th>
<th>PART II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total points = 29</td>
<td>Total points = 30</td>
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<tr>
<td><strong>Errors</strong></td>
<td><strong>Errors</strong></td>
</tr>
<tr>
<td><strong>%</strong></td>
<td><strong>%</strong></td>
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<td>1</td>
<td>97</td>
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<tr>
<td>2</td>
<td>93</td>
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<tr>
<td>3</td>
<td>90</td>
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<td>4</td>
<td>86</td>
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<td>83</td>
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<td>67</td>
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<td>11</td>
<td>63</td>
</tr>
<tr>
<td>12</td>
<td>60</td>
</tr>
</tbody>
</table>
MATH ANSWER SHEET
(E010G)

PART I

1. Selling price = purchase price + markup
   \[ 1424 = P_p + 0.6P_p \]
   \[ 1424 = 1.6P_p \]
   \[ $890 = P_p \]

2. Downstream: \((B + W)T_D = D_D\) (a)
   Upstream: \((B - W)T_U = D_U\) (b)
   \[(a') \ (18 + W)T = 132 \]
   \[(b') \ (18 - W)T = 84 \]

3. \(R_D T_D = 720\);
   \(R_M T_M = 200\);
   \[ \frac{D_D}{720} \quad \frac{D_M}{200} \]
   \(T_D = 2T_M\);
   \(R_D = R_M + 40\)
   \[(R_M + 40)2T_M = 720 \]
   \(2R_M T_M + 80T_M = 720 \]
   \(2(200) + 80T_M = 720 \]
   \(80T_M = 320 \]
   \(T_M = 4 \text{ hr} \)
   \(T_D = 8 \text{ hr}; R_M = 50 \text{ mph}; R_D = 90 \text{ mph} \)

4. \( \frac{P_1}{T_1} = \frac{P_2}{T_2} \)
   \[ \frac{400}{300} = \frac{600}{T_2} \]
   \[ T_2 = 450 \text{ K} \]

5. \(11N \quad 11(N + 1) \quad 11(N + 2) \)
   \[4(11N + 11N + 22) = 10(11N + 11) - 66 \]
   \[88N + 88 = 110N + 44 \]
   \[44 = 22N \]
   \[2 = N \]
   The desired integers are 22, 33 and 44.

6. \[ \frac{x^2 - xy + y^2}{x^3 + x^2 y - x^2 y - xy^2 + xy^2 + y^3} \]

7. \[ \frac{x^2 + xy + y^2}{x^3 - x^2 y} \]

8. Since 2 is not a member of the domain of \(b(x)\), it is not a member of the domain of \(ab(x)\). Therefore, the answer is either \(\emptyset\) or \(\{\}\).

9. \[ y = x^2 + 4x + 6 \]
   \[ y = (x^2 + 4x + 4) + 6 - 4 \]
   \[ y = (x + 2)^2 + 2 \]
   From this we see:
   (a) Opens upward
   (b) Axis of symmetry is \(x = -2\)
   (c) \(y\) coordinate of vertex is +2
10. \[ y = -x^2 + 4x - 6 \]
\[-y = -(x^2 - 4x + 4) + 6 - 4 \]
\[-y = (x - 2)^2 + 2 \]
\[ y = -(x - 2)^2 - 2 \]

From this we see:
(a) Opens downward
(b) Axis of symmetry is \( x = 2 \)
(c) \( y \) coordinate of vertex is \(-2\)

11. \( x + 3 \geq 5; \ D = \{ \text{Reals} \} \)
\[ x \geq 2 \]
\[ 1 \ 2 \ 3 \ 4 \ 5 \]

12. \[ N = \frac{1}{4} + \frac{2}{3} \left( \frac{2}{3} - \frac{1}{4} \right) \]
\[ = \frac{1}{4} + \frac{2}{3} \left( \frac{10}{4} - \frac{1}{4} \right) \]
\[ = \frac{1}{4} + \frac{3}{2} \]
\[ = \frac{1}{4} + \frac{6}{4} = \frac{7}{4} \]

13. (a) \( 4x + 3y = 17 \)
(b) \( 2x - 3y = -5 \)
\[ y = \frac{2}{3} x + \frac{5}{3} \]

Substitute (b) into (a) and get:
(a') \[ 4x + \frac{3}{2} \left( \frac{2}{3} x + \frac{5}{3} \right) = 17 \]
\[ 4x + 2x + 5 = 17 \]
\[ 6x = 12 \]
\[ x = 2 \]

(b) \[ y = \frac{2}{3} (2) + \frac{5}{3} \]
\[ y = \frac{4}{3} + \frac{5}{3} = 3 \]

(2, 3)

14. (a) \( x^2 + y^2 = 6 \)
(b) \( x - y = 2 \)
\[ y = x - 2 \]

Substitute (b) into (a) and get:
(a') \[ x^2 + (x - 2)^2 = 6 \]
\[ x^2 + x^2 - 4x + 4 = 6 \]
\[ 2x^2 - 4x - 2 = 0 \]
\[ x^2 - 2x - 1 = 0 \]

Solve this equation by using the quadratic formula.
\[ x = \frac{4 \pm \sqrt{(-2)^2 - 4(1)(-1)}}{2(1)} = 1 \pm \sqrt{2} \]

Substitute these values of \( x \) into (b) and solve for \( y \).
(b) \[ y = (1 + \sqrt{2}) - 2 \]
\[ y = -1 + \sqrt{2} \]

(b') \[ y = (1 - \sqrt{2}) - 2 \]
\[ y = -1 - \sqrt{2} \]

(1 + \sqrt{2}, -1 + \sqrt{2}) and (1 - \sqrt{2}, -1 - \sqrt{2})

15. (a) \( x^2 + y^2 = 10 \)
\[ y^2 = 10 - x^2 \]
(b) \( 2x^2 - 2y^2 = 5 \)

Substitute (a) into (b) and get:
(b') \[ 2x^2 - 2(10 - x^2) = 5 \]
\[ 2x^2 - 20 + 2x^2 = 5 \]
\[ 4x^2 = 25 \]
\[ x^2 = \frac{25}{4} \]
\[ x = \pm \frac{5}{2} \]

Substitute these values of \( x \) into (a) and solve for \( y \).
(a) \[ y^2 = 10 - \left( \frac{5}{2} \right)^2 \]
\[ y = \pm \frac{3}{2} \]

(a') \[ y^2 = 10 - \left( -\frac{5}{2} \right)^2 \]
\[ y = \pm \frac{1}{2} \left( \frac{5}{2}, \pm \frac{5}{2} \right) \text{ and } \left( -\frac{5}{2}, \pm \frac{1}{2} \right) \]
16. (a) \( x + 2y + z = -1 \)
(b) \( 3x - y + z = 6 \)
(c) \( 2x - 3y - z = 8 \)

(b) \( 3x - y + z = 6 \)
(c) \( 2x - 3y - z = 8 \)

(d) \( 5x - 4y = 14 \)

(a) \( x + 2y + z = -1 \)
(c) \( 2x - 3y - z = 8 \)
(e) \( 3x - y = 7 \)
(e) \( y = 3x - 7 \)
Substitute (e) into (d) and get:
(d') \( 5x - 4(3x - 7) = 14 \)
\( 5x - 12x + 28 = 14 \)
\( 7x = 14 \)
\( x = 2 \)
(e) \( y = 3(2) - 7 = -1 \)
(a) \( (2) + 2(-1) + z = -1 \)
\( z = -1 \)
(2, -1, -1)

17. (a) \( x - 4y \leq -4 \)
\( y \geq \frac{1}{4}x + 1 \)
(b) \( x < 3 \)
The first step is to graph each of these lines.

18. \(-3 \leq x - 3 \leq 4; D = \{ \text{Integers} \} \)
\( 0 \leq x \leq 7 \)

19. \( \frac{x^{2ab-2b}}{x^{b/2}} = x^{2ab-5b/2} \)

20. \( \frac{m}{m^2 + \frac{1}{m}} = \frac{m}{m^2 + \frac{1}{m}} = \frac{m}{m^3 + 1} \)
\( = \frac{m(m^3 + 1)}{m^5 + m^2 + m^2} = \frac{m^3 + 1}{m^4 + 2m} \)

21. \( \sqrt[4]{x^2y^3} \sqrt[4]{xy} = x^{2/5}y^{3/5}\frac{1}{4}y^{1/4} = x^{13/20}y^{17/20} \)

22. \( \frac{-2 - i}{-i} \frac{-i - 2}{-i - 2} = \frac{2i + 4 - 1 + 2i}{-i - 4} = \frac{3 + 4i}{-5} = \frac{3}{5} - \frac{4i}{5} \)

23. \( \frac{2i}{-5} \frac{-5 + 2i}{-5 - 2i} = \frac{-10i - 4 + 25 - 10i}{25 + 4} = \frac{21}{29} - \frac{20i}{29} \)

24. \( \frac{3 + 2\sqrt{5}}{5 - 2\sqrt{5}} \frac{5 + 2\sqrt{5}}{5 + 2\sqrt{5}} = \frac{15 + 6\sqrt{5} + 10\sqrt{5} + 20}{25 - 20} = \frac{35 + 16\sqrt{5}}{5} \)

25. \( A = 6 \cos 29^\circ = 5.25 \)
\( B = 6 \sin 29^\circ = 2.91 \)
\(-5.25R - 2.91U = 0.00R + 4.00U = -5.25R + 1.09U \)
\( \tan \theta = -\frac{1.09}{5.25} \)
\( \theta = -11.73^\circ \)
Since \( \theta \) is a second-quadrant angle:
\( \theta = (-11.73) + 180 = 168.27^\circ \)
\( F = \sqrt{(-5.25)^2 + (1.09)^2} = 5.36 \)

5.36/168.27\(^\circ\)

26. \( a \left( \frac{b - \frac{1}{x}}{c} \right) = \frac{m}{p} \)
\( \frac{ab}{c} - \frac{a}{x} = \frac{m}{p} \)
\( abp - acp = cmx \)
\( abp - cmx = acp \)
\( x = \frac{acp}{abp - cm} \)

27. \( \sqrt{z} + \sqrt{z + 33} = 11 \)
\( \sqrt{z} + 33 = 11 - \sqrt{z} \)
\( z + 33 = 121 - 22\sqrt{z} + z \)
\( 22\sqrt{z} = 88 \)
\( \sqrt{z} = 4 \)
\( z = 16 \)
Check: \( \sqrt{16} + \sqrt{16 + 33} = 11 \)
\( 4 + 7 = 11 \)
28. \(4i - 2i(-3) - i = 4i + 6i - i = 9i\)

29. \[
\frac{\sqrt{2}}{3} - 2\sqrt{\frac{3}{4}} + 5\sqrt{48} = \frac{6}{\sqrt{3}} - \sqrt{3} + 5\sqrt{48} \\
= \frac{6\sqrt{3}}{3} - \sqrt{3} + 20\sqrt{3} = 21\sqrt{3}
\]

End Part I

MATH ANSWER SHEET
(EO10G)

PART II

1. (a) \(N_\text{N} + N_\text{D} + N_\text{Q} = 26\)

(b) \(5N_\text{N} + 10N_\text{D} + 25N_\text{Q} = 225\)

(c) \(10N_\text{Q} = N_\text{N}\)

We begin by substituting using equation (c) \(10N_\text{Q}\) for \(N_\text{N}\) in equations (a) and (b).

(a) \((10N_\text{Q}) + N_\text{D} + N_\text{Q} = 26\) \(
\longrightarrow N_\text{D} + 11N_\text{Q} = 26\) \((a')\)

(b) \(5(10N_\text{Q}) + 10N_\text{D} + 25N_\text{Q} = 225\) \(
\longrightarrow 10N_\text{D} + 75N_\text{Q} = 225\) \((b')\)

To solve, we will multiply equation \((a')\) by \(-10\) and add the equations.

\(-10(a')\) \(-10N_\text{D} - 110N_\text{Q} = -260\)

\(10N_\text{D} + 75N_\text{Q} = 225\)

\(-35N_\text{Q} = -35\)

\(N_\text{Q} = 1\)

Now we can state that there are 10 nickels because \(N_\text{N} = 10N_\text{Q}\), and this means 15 dimes because there are 26 coins in all. So

\(N_\text{D} = 15\quad N_\text{N} = 10\quad N_\text{Q} = 1\)

2. Number of blues + number of greens + number of yellows = 7

(a) \(N_\text{B} + N_\text{G} + N_\text{Y} = 7\)

Weight of blues + weight of greens + weight of yellows = 25

(b) \(N_\text{B} + 4N_\text{G} + 5N_\text{Y} = 25\)

There was 1 more yellow than green

(c) \(N_\text{G} + 1 = N_\text{Y}\)

To begin, we will replace \(N_\text{Y}\) in (a) and (b) with \(N_\text{G} + 1\) and then simplify.

\(a)\) \(N_\text{B} + N_\text{G} + (N_\text{G} + 1) = 7\) \(
\longrightarrow N_\text{B} + 2N_\text{G} = 6\) \((a')\)

\(b)\) \(N_\text{B} + 4N_\text{G} + 5(N_\text{G} + 1) = 25\) \(
\longrightarrow N_\text{B} + 9N_\text{G} = 20\) \((b')\)

Now we multiply \((a')\) by \(-1\) and add the result to \((b')\).

\(-1(a')\) \(-N_\text{B} - 2N_\text{G} = -6\)

\((b')\) \(N_\text{B} + 9N_\text{G} = 20\)

\[7N_\text{G} = 14\]

Now since \(N_\text{Y} = N_\text{G} + 1\), there were 3 yellows.

\(N_\text{Y} = 3\)

There must have been 2 blues because the total was 7.

\(N_\text{G} = 2\quad N_\text{B} = 2\quad N_\text{Y} = 3\)
3. \( T = \text{ tens' digit} \)
\( U = \text{ units' digit} \)

\( 10T + U = \text{ original number} \)

(a) \( 10T + U = 4(T + U) \)
(b) \( U = T + 1 \)

Substitute (b) into (a) and get:

(a') \( 10T + (T + 1) = 4T + 4(T + 1) \)

\[ 11T + 1 = 8T + 4 \]
\[ 3T = 3 \]
\[ T = 1 \]

(b) \( U = 1 + 1 = 2 \)

Original number = 12

4. \( N \)

\( N(N + 1) \)

\( N(N + 2) = 5(N + 1) + 35 \)

\( N^2 + 2N = 5N + 40 \)

\( N^2 - 3N - 40 = 0 \)

Solve this equation by factoring.

\( (N - 8)(N + 5) = 0 \)

\( N = 8, -5 \)

The desired integers are 8, 9, 10 and -5, -4, -3.

5. Equal ratio method:

\[ \frac{S_1}{S_2} = \frac{T_1(A_1)^2}{T_2(A_2)^2} \]

\[ \frac{1000}{S_2} = \frac{5(2)^2}{8(1)^2} \]

\[ S_2 = 400 \]

Variation method:

\[ S = kTA^2 \]

\[ 1000 = k(5)(2)^2 \]

\[ 50 = k \]

\[ S = (50)(8)(1)^2 \]

\[ S = 400 \]

6. \((x + 4)(x - 2) > 0; D = \{ \text{Integers} \}\)

(POS)(POS) > 0
\[ x + 4 > 0 \quad \text{and} \quad x - 2 > 0 \]
\[ x > -4 \quad \text{and} \quad x > 2 \]

(NEG)(NEG) > 0
\[ x + 4 < 0 \quad \text{and} \quad x - 2 < 0 \]
\[ x < -4 \quad \text{and} \quad x < 2 \]

Thus, the solution is \( x > 2 \) or \( x < -4 \).

7. \( x^2 - 5x + 6 > 0; D = \{ \text{Integers} \}\)

(POS)(POS) > 0
\[ x - 3 > 0 \quad \text{and} \quad x - 2 > 0 \]
\[ x > 3 \quad \text{and} \quad x > 2 \]

(NEG)(NEG) > 0
\[ x - 3 < 0 \quad \text{and} \quad x - 2 < 0 \]
\[ x < 3 \quad \text{and} \quad x < 2 \]

Thus, the solution is \( x > 3 \) or \( x < 2 \).

8. \((x^{1/2} + y^{1/4})^2\)

\[ x^{1/2} + y^{1/4} \]

\[ x^{1/2} - y^{1/4} \]

\[ x + x^{1/2}y^{1/4} + y^{1/4} \]

\[ x - x^{1/2}y^{1/4} + y^{1/4} \]

9. \((x^{1/2} - y^{-1/2})^2\)

\[ x^{1/2} + y^{-1/2} \]

\[ x^{1/2} - y^{-1/2} \]

\[ x - x^{1/2}y^{-1/2} \]

\[ x - 2x^{1/2}y^{-1/2} + y^{-1} \]

10. Apply the power rule and get \( xy^{-1} \)

11. \( x^3 - m^6y^6 = (x)^3 - (m^2y^2)^3 \)

\[ = (x - m^2y^2)(x^2 + m^2xy^2 + m^4y^4) \]

12. \( 8x^6y^3 - 27m^3p^{12} = (2x^3y)^3 - (3mp)^3 \)

\[ = (2x^3y - 3mp)(4x^6y^2 + 6x^3ymp^2 + 9m^2p^8) \]

13. \( 100N = 102.1313... \)

\[ N = 1.021313... \]

\[ 99N = 101.11 \]

\[ N = \frac{10.1111}{9900} \]
14. \(-y = x^2 + 4x + 1\)
   \(-y = (x^2 + 4x + 4) + 1 - 4\)
   \(-y = (x + 2)^2 - 3\)
   \(y = -(x + 2)^2 + 3\)

   From this we see:
   (a) Opens downward
   (b) Axis of symmetry is \(x = -2\)
   (c) \(y\) coordinate of vertex is 3

   ![Graph of a parabola]

15. \(-|x| - 3 \geq -7; D = \{\text{Reals}\}\)
   \(-|x| \geq -4\)
   \(|x| \leq 4\)
   \(x \leq 4\) and \(x \geq -4\)

16. \(-2 \leq x + 5 < 4; D = \{\text{Integers}\}\)
   \(-7 \leq x < -1\)

17. (a) \(\frac{3}{5}x - \frac{2}{5}y = -10\)
   (b) \(0.003x + 0.2y = 1.97\)
   (a') \(3x - 2y = -50\)
   (b') \(3x + 200y = 1970\)

   \(-1(a') -3x + 2y = 50\)
   \(b') 3x + 200y = 1970\)
   \(202y = 2020\)
   \(y = 10\)
   (a') \(3x - 2(10) = -50\)
   \(x = -10\)
   \((-10, 10)\)

18. (a) \(x + 2y = 10\)
   (b) \(x - 3z = -16\)
   (c) \(y + 2z = 16\)

   \(2(b) + 3(c): 2x + 3y = 16\) (d)
   \(-2(a) + (d): -y = -4\)
   \(y = 4\)

   (a) \(x + 2(4) = 10\)
   \(x = 2\)
   (c) \((4) + 2z = 16\)
   \(z = 6\)
   \((2, 4, 6)\)

19. (a) \(x^2 + y^2 = 4\)
   (b) \(x - y = 1\)
   \(y = x - 1\)

   Substitute (b) into (a) and get:
   (a') \(x^2 + (x - 1)^2 = 4\)
   \(x^2 + x^2 - 2x + 1 = 4\)
   \(2x^2 - 2x - 3 = 0\)

   Solve this equation by using the quadratic formula.
   \(x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(-3)}}{2(2)}\)
   \(x = \frac{1}{2} \pm \frac{\sqrt{7}}{2}\)

   Substitute these values of \(x\) into (b) and solve for \(y\).
   (b) \(y = \left(\frac{1}{2} + \frac{\sqrt{7}}{2}\right) - 1\)
   \(y = \frac{1}{2} + \frac{\sqrt{7}}{2}\)
   (b) \(y = \left(\frac{1}{2} - \frac{\sqrt{7}}{2}\right) - 1\)
   \(y = \frac{1}{2} - \frac{\sqrt{7}}{2}\)

20. \(2x^2 - 3x - 5 = 0\)

21. \(40 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} \times \frac{3600 \text{ sec}}{1 \text{ hr}} = 12000 \text{ ft/hr}\)

22. \(\frac{2i^3 - \sqrt{-3} \sqrt{-3}}{4 - 3i^2} = \frac{-2i + 3}{7} = \frac{3}{7} - \frac{2}{7}i\)

23. \(\frac{2\sqrt{3} + 2}{3 - \sqrt{3}} \cdot \frac{3 + \sqrt{3}}{3 + \sqrt{3}} = \frac{6\sqrt{3} + 6 + 6 + 2\sqrt{3}}{9 - 3} = \frac{6 + 4\sqrt{3}}{3}\)
24. \[ \frac{a^{1/2} y^{1-1/2}}{a^{3/2} y^{-2x}} = a^{-5x/2} y^{1+3x/2} \]

25. \[ \sqrt{xy} \sqrt{x^2 y} = x^{1/2} y^{1/2} = x y^{1/2} = x^{3/2} y \]

26. \[
\frac{\sqrt{2}}{\sqrt{7}} - \frac{3\sqrt{2}}{\sqrt{2}} + 2\sqrt{26} = \frac{\sqrt{14}}{7} - \frac{3\sqrt{14}}{7} + 6\sqrt{14} \\
= \frac{2\sqrt{14}}{14} - \frac{21\sqrt{14}}{14} + \frac{84\sqrt{14}}{14} = \frac{65\sqrt{14}}{14}
\]

27. (a) \(-y < 3\) \(y > -3\)

(b) \(3x + y \leq 3\) \(y \leq -3x + 3\)

The first step is to graph each of these lines.

![Graph of lines](image)

The region we wish to find is on and below the solid line and above the dashed line. This region is shaded in the previous figure.

28.

![Diagram](image)

\[ A = 20 \cos 45^\circ = 14.14 \]
\[ B = 20 \sin 45^\circ = 14.14 \]

\[ -6.00R + 0.00U \]
\[ 14.14R + 14.14U \]
\[ 8.14R + 14.14U \]

\[ \tan \theta = \frac{14.14}{8.14} \]
\[ \theta = 60.07^\circ \]

\[ F = \sqrt{(8.14)^2 + (14.14)^2} = 16.32 \]

\[ 16.32/60.07^\circ \]

29. \[ 2x^2 - x - 10 = 0 \]
\[ 2x^2 + 4x - 5x - 10 = 0 \]
\[ 2x(x + 2) - 5(x + 2) = 0 \]
\[ (2x - 5)(x + 2) = 0 \]

\[ 2x - 5 = 0 \quad x + 2 = 0 \]
\[ x = \frac{5}{2} \quad x = -2 \]

\[ \frac{5}{2}, -2 \]

30. \[ 2x^3 - 7x^2 - 15x = 0 \]
\[ x(2x^2 - 7x - 15) = 0 \]
\[ x(2x^2 - 10x + 3x - 15) = 0 \]
\[ x(2x(x - 5) + 3(x - 5)) = 0 \]
\[ x(2x + 3)(x - 5) = 0 \]

\[ x = 0 \quad 2x + 3 = 0 \quad x - 5 = 0 \]
\[ x = -\frac{3}{2} \quad x = 5 \]

\[ 0, -\frac{3}{2}, 5 \]