

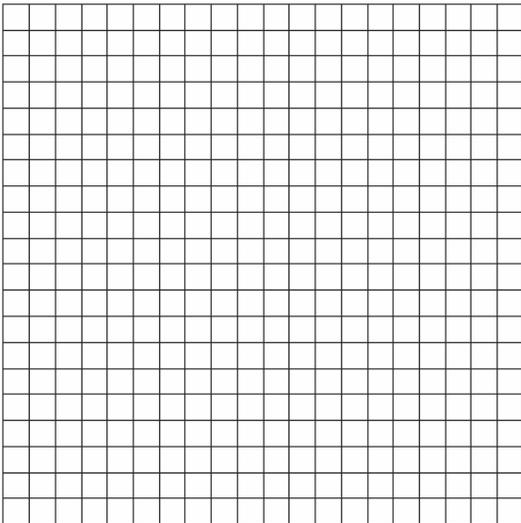
NAME: _____

A2.A.3: Solve systems of equations involving one linear and one quadratic equation algebraically

Note: This includes rational equations that result in linear equations with extraneous roots

1. 060228b, P.I. A2.A.3

A pelican flying in the air over water drops a crab from a height of 30 feet. The distance the crab is from the water as it falls can be represented by the function $h(t) = -16t^2 + 30$, where t is time, in seconds. To catch the crab as it falls, a gull flies along a path represented by the function $g(t) = -8t + 15$. Can the gull catch the crab before the crab hits the water? Justify your answer. [The use of the grid is optional.]

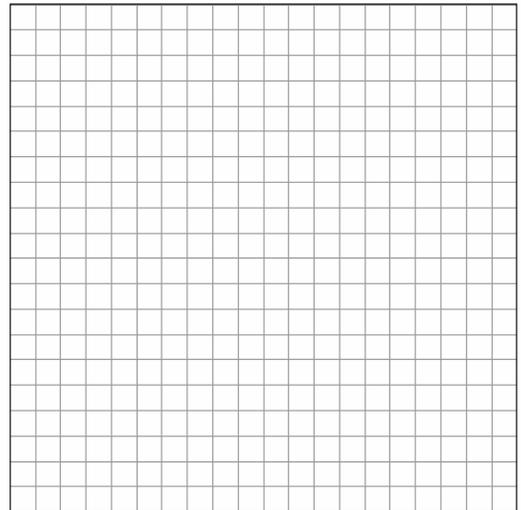


2. 060328b, P.I. A2.A.3

The price of a stock, $A(x)$, over a 12-month period decreased and then increased according to the equation

$$A(x) = 0.75x^2 - 6x + 20, \text{ where } x \text{ equals the}$$

number of months. The price of another stock, $B(x)$, increased according to the equation $B(x) = 2.75x + 1.50$ over the same 12-month period. Graph and label both equations on the accompanying grid. State all prices, to the *nearest dollar*, when both stock values were the same.



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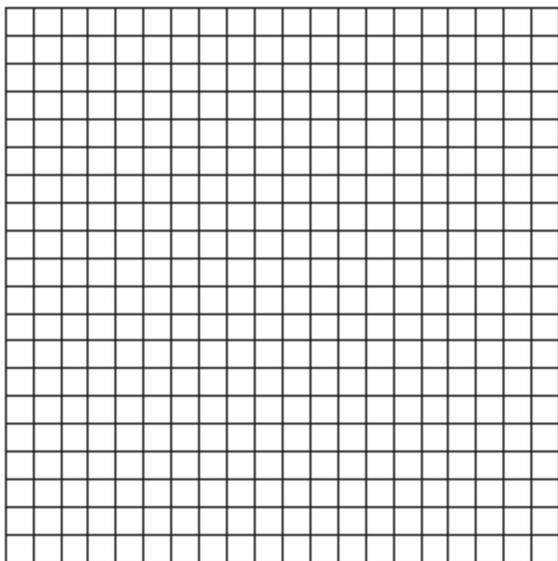
3. 060439a, P.I. A2.A.3

Solve the following system of equations algebraically or graphically:

$$x^2 + y^2 = 25$$

$$3y - 4x = 0$$

[The use of the accompanying grid is optional.]



4. 060119a, P.I. A2.A.3

What is the total number of points of intersection in the graphs of the equations $x^2 + y^2 = 16$ and $y = 4$?

- [A] 1 [B] 3 [C] 2 [D] 0

5. 060627b, P.I. A2.A.3

Solve the following system of equations algebraically:

$$9x^2 + y^2 = 9$$

$$3x - y = 3$$

A2.A.3: Solve systems of equations involving one linear and one quadratic equation algebraically

Note: This includes rational equations that result in linear equations with extraneous roots

- [4] Yes, and appropriate work is shown, and an appropriate justification is given.
- [3] Appropriate work is shown, and an appropriate justification is given, but one computational error is made, or the negative value of t is not rejected.
- [2] An appropriate graph or equation is shown, such as $16t^2 - 8t - 15 = 0$.
- [1] An incorrect graph or equation of equal difficulty is used, but an appropriate solution is found.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [4] 9 and 26, and appropriate work is shown, such as graphing and labeling the equations and identifying the points of intersection.
- [3] Both functions are graphed correctly, and the points of intersection are indicated, but the prices are not stated.
- or [3] The parabola is graphed correctly, but the line is graphed incorrectly, but appropriate prices are stated.
- [2] The line and the parabola are graphed and labeled, but a conceptual error is made, such as only one price is found because the graph of the parabola is incomplete.
- or [2] The line is graphed correctly, but the parabola is graphed incorrectly, but appropriate prices are stated.
- or [2] 9 and 26, but only an algebraic solution is shown.
- [1] Both the line and the parabola are graphed incorrectly, but appropriate prices are stated.
- or [1] 9 and 26, but no work is shown.
- [0] 9 or 26, but no work is shown.
- or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [4] (3,4) and (-3,-4), and a correct algebraic or graphic solution is shown.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- or [3] Appropriate work is shown for an algebraic or graphic solution, but only one correct ordered pair is found or the correct values are found only for x or for y .
- [2] Appropriate work is shown, but two or more computational or graphing errors are made.
- or [2] Both equations are graphed correctly, but neither ordered pair is identified.
- or [2] The line is graphed correctly, but the circle is graphed as a semicircle, and only one correct solution is identified.
- or [2] An incorrect quadratic equation of equal difficulty is solved appropriately, and an appropriate solution or solutions are found.
- or [2] The linear equation is graphed correctly and correct points of the circle are graphed, but the points are connected to form a quadrilateral, but appropriate ordered pairs are identified.
- [1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.
- or [1] One equation is graphed correctly, but no further correct work is shown.
- or [1] An incorrect equation of a lesser degree of difficulty, such as a linear equation, is solved appropriately, and an appropriate solution or solutions are found.
- or [1] A correct quadratic equation is set equal to zero, but no further correct work is shown.
- or [1] (3,4) and (-3,-4), but no work is shown.
- [0] (3,4) or (-3,-4), but no work is shown.
- or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [4] A
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[4] (0,-3) and (1,0) or an equivalent answer, and appropriate algebraic work is shown.

[3] Appropriate work is shown, but one computational error is made.

or [3] Appropriate work is shown, but only one correct solution is found or only the x - or the y -values are found correctly.

[2] Appropriate work is shown, but two or more computational errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] (0,-3) and (1,0), but a method other than an algebraic solution is used.

or [2] A correct quadratic equation is written in standard form, such as $18x^2 - 18x = 0$, but no further correct work is shown.

or [2] An incorrect quadratic equation of equal difficulty is solved appropriately.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or [1] An incorrect equation of a lesser degree of difficulty is solved appropriately.

or [1] $y = 3x - 3$ is found and substituted into the second equation, but no further correct work is shown.

or [1] (0,-3) and (1,0), but no work is shown.

[0] Only one correct solution is found or only the x - or the y -values are found correctly, and no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[5] obviously incorrect procedure.