FACTORING QUADRATICS

Directions: Fill in the blanks with **integers** so that the quadratic expression is factorable.

1. $x^2 + \underline{} x + 4$

2. $x^2 + \underline{} x - 12$

3. $3x^2 + \underline{} x + 8$

4. $2x^2 + 3x + \underline{}$

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21. Suppose a friend tells you she paid a total of $16,368 for a car, and you'd like to know the car's list price (the price before taxes) so that you can compare prices at various dealers. Find the list price of the car if your friend bought the car in:

$16368 = 1.066x$

a) Arizona, where the sales tax is 6.6%. $\$15,355 = x$

b) New York, where the sales tax is 8.25%. $16368 = 1.0825x$

         $\$15,121 = x$

c) A state where the sales tax is r.

   $\dfrac{16368}{1+r} = P$ (https://www.illustrativemathematics.org/content-standards/HSA/CED/A/1/tasks/582)

         $16368 = P(1+r)$

22. Stephen wants to create a landscaping feature in the shape of a <u>parallelogram</u> in his yard. Stephen has 200 square feet of mulch available for the project. To be most pleasing to the eye, he decides that he wants the length of the parallelogram to be 3 more than twice the width, measured in feet. If Stephen intends to cover the entire landscape feature in mulch, what can the width of the parallelogram be? — write an equation to show the scenario

     $w(2w+3) = 200$

     $2w^2 + 3w - 200 = 0$

23. The larger leg of a right triangle is 3 cm longer than its smaller leg. The hypotenuse is 6 cm longer than the smaller leg. How many centimeters long is the smaller leg?
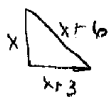
$$x^2 + (x+3)^2 = (x+6)^2$$
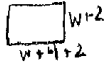$$x^2 + x^2 + 6x + 9 = x^2 + 12x + 36$$
$$-x^2 - 12x - 36$$
$$x^2 - 6x - 27 = 0$$
$$(x-9)(x+3)$$

$\boxed{9 \text{ cm}}$

24. The floor of a rectangular cage has a length 4 feet greater than its width, w. James will increase both dimensions of the floor by 2 feet. Which equation represents the new area, N, of the floor of the cage?

$$(w+2)(w+6)$$
$$\boxed{w^2 + 8w + 12}$$

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25. The FFA had a fundraiser by selling hot dogs for $1.50 and drinks for $2.00. Their total sales were $400.
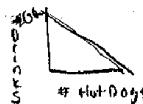
a) Write an equation to calculate the total of $400 based on the hot dog and drink sales.

$$1.50x + 2y = 400 \qquad x: \text{hot dog}$$
$$y: \text{drinks}$$

b) Graph the relationship between hot dog sales and drink sales.

$$y = -\tfrac{3}{4}x + 200$$

26. In a woman's professional tennis tournament, the money a player wins depends on her finishing place in the standings. The first-place finisher wins half of $1,500,000 in total prize money. The second-place finisher wins half of what is left; then the third-place finisher wins half of that, and so on.

   a) Write a rule to calculate the actual prize money in dollars won by the player finishing in nth place, for any positive integer n. $1,500,000(.5)^n = P(n)$

   b) Graph the relationship between the first 10 finishers and the prize money in dollars.
   What pattern is indicated in the graph? What type of relationship exists between the two variables?

   exponential decay
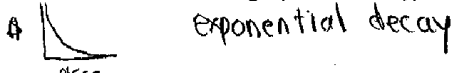
27. A club is selling hats and jackets as a fundraiser. Their budget is $1500 and they want to order at least 250 items. They must buy at least as many hats as they buy jackets. Each hat costs $5 and each jacket costs $8.

   a) Write a system of inequalities to represent the situation. $5x + 8y \le 1500$ $x \ge y$
   $x + y \ge 250$

   b) If the club buys 150 hats and 100 jackets, will the conditions be satisfied? $750 + 800 \le 1500$ No
   $1550 \le 1500$

   c) What is the maximum number of jackets they can buy and still meet the conditions?
   $y \le -\frac{5}{8}x + 187.5$ $y \le x$
   $y \ge -x + 250$

Complete 5 questions of calculator active EOC prep on Canvas

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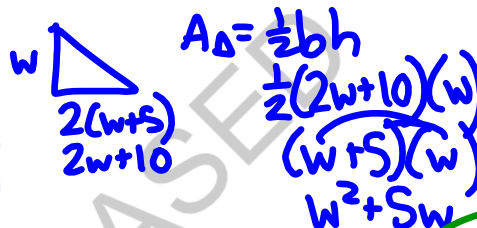
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36   David has a rectangle and a right triangle.

- The length of the rectangle is 5 more than its width, w.
- The length of the shorter leg of the triangle is equal to the rectangle's width.
- The length of the longer leg of the triangle is twice the length of the rectangle.
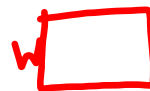
Which function, $f(w)$, represents the combined area of the rectangle and the triangle?

- A $f(w) = 2w^2 + 10w$
- B $f(w) = 3w^2 + 15w$
- C $f(w) = w^2 + 10w + 25$
- D $f(w) = w^2 + 15w + 50$

(handwritten work)

w — rectangle with $w+5$

$A_\square = w(w+5) = w^2 + 5w$

$A_\triangle = \frac{1}{2}bh$

$2(w+5)$
$2w+10$

$\frac{1}{2}(2w+10)(w)$
$(w+5)(w)$
$w^2 + 5w$

$A = w^2 + 5w + w^2 + 5w = 2w^2 + 10w$

37   The table below shows the number of hours 7 students studied for a math test and the grade each student earned on the test.

Student	Hours Studied (x)	Test Grade (y)
Mary	2.00	84
Jonathan	1.75	86
Susan	2.00	88
Terry	3.00	94
Patrick	3.50	95
Amanda	3.50	93
Darius	2.25	89

How does Amanda's test score compare to the score predicted using the linear best-fit model of data for a student who studied 3.50 hours?

A   Amanda scored about 5 points lower than the score predicted for a student who studied 3.50 hours.

B   Amanda scored about 5 points higher than the score predicted for a student who studied 3.50 hours.

C   Amanda scored about 2 points lower than the score predicted for a student who studied 3.50 hours.

D   Amanda scored about 2 points higher than the score predicted for a student who studied 3.50 hours.

x_1	y_1	e_1
2	84	−2.8930481
1.75	86	0.40374332
2	88	1.1069519
3	94	1.9197861
3.5	95	0.32620321
3.5	93	−1.6737968
2.25	89	0.81016043

Amanda

$$y_1 \sim mx_1 + b$$

STATISTICS   RESIDUALS

$r^2 = 0.8408$ e_1 PLOT

$r = 0.917$

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38   This is a paper/pencil copy of an online technology enhanced item.

Place (click and drag) one option from each of the lists below into the corresponding box to create an equation of the line that passes through the point (1, ⁻10) and is perpendicular to $y = \frac{-1}{3}x + 5$.

perpendicular slope is 3

$$y = \boxed{3x} - \boxed{13}$$

$$y = mx + b$$
$$-10 = 3(1) + b$$
$$-10 = 3 + b$$
$$\underline{-3 \quad -3}$$
$$-13 = b$$

$$y = 3x - 13$$

1	2	3
$\frac{-1}{5}x$	+	1
$\frac{-1}{?}x$	−	5
3x		10
5x		13

39   Two functions are shown below.

$$f(x) = 3x + 7$$

$$g(x) = 2x + 12$$

graph

What is the value of x where the graphs of $f(x)$ and $g(x)$ intersect?

A   -22

B   -5

C   5

D   22

3x+7=2x+12
-2x   -2x
x+7 =   12
-7   -7
x = 5

by hand

40   Marcus measured the height, in inches, y, of plants over the course of 3 weeks. The correlation coefficient between the number of days, x, and the height of the plants is 0.85. Which could be concluded based on the correlation coefficient of the data?

A   There is a strong relationship showing that as the number of days increases, the height of the plants increases.

B   There is a strong relationship showing that as the number of days increases, the height of the plants decreases.

C   There is a weak relationship showing that as the number of days increases, the height of the plants increases.

D   There is a weak relationship showing that as the number of days increases, the height of the plants decreases.

Complete Page 5