

Name: _____

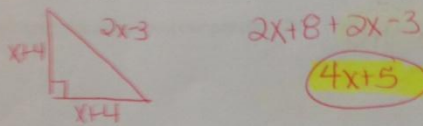
Quadratics Test | 2014

Show all work to receive credit. Any separate work must be stapled to the paper. Express fractional answers in simplest form. Give units for word problems.

- 1) The volume of a box has a height of $x+2$, a width of $x-3$, and a length of $x+4$. Write an expression to represent the volume of the box. Distribute and combine the expression.

$$\begin{aligned} & (x+2)(x-3)(x+4) \\ & (x^2-x-6)(x+4) \\ & \cancel{x^3} - \cancel{x^2} - 6x + 4x^2 - 4x - 24 = x^3 + 3x^2 - 10x - 24 \end{aligned}$$

- 2) The length of the leg of an isosceles right triangle is represented by $x+4$. The length of the hypotenuse of the same triangle is represented by $2x-3$. Write an expression to show the perimeter of the triangle.



- 3) Two friends start a furniture business called the Painted Birch. The cost of materials to produce x pieces of furniture is given by the polynomial $0.5x^2 - 0.4x + 4$. The cost of marketing to sell x pieces of furniture is represented by the polynomial $0.2x^2 + 2x - 3$. Write and simplify a polynomial expression that represents the total cost of purchasing materials and marketing to sell x pieces of furniture.

$$0.7x^2 - 0.2x + 1$$

- 4) The length of a rectangle is $2x+2$. The width is $x+4$. Solve for x if the area of the rectangle is 80 square feet.

$$2x^2 + 8x + 2x + 8$$

$$\begin{array}{r} 2x^2 + 10x + 8 = 80 \\ \underline{-80} \quad \underline{-80} \\ 2x^2 - 10x - 72 = 0 \end{array}$$

$$x = 4$$

$$y_1 = (2x+2)(x+4)$$

$$y_2 = 80$$

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5) Distribute and combine: $3(x^3 - 5x^2 + 3x - 2) - 2(3x^3 - 2x + 5)$

$$\begin{aligned} & 3x^3 - 15x^2 + 9x - 6 - 6x^3 + 4x - 10 \\ & -3x^3 - 15x^2 + 13x - 16 \end{aligned}$$

6) Distribute and combine: $2(x - 5)(2x + 4)$

$$\begin{aligned} & (2x - 10)(2x + 4) \\ & 4x^2 + 8x - 20x - 40 \\ & 4x^2 - 12x - 40 \end{aligned}$$

7) Find the product: $(x^2 + 3x - 4)(2x - 1)$

$$\begin{aligned} & 2x^3 - x^2 + 6x^2 - 3x - 8x + 4 \\ & 2x^3 + 5x^2 - 11x + 4 \end{aligned}$$

8) Solve for the roots of the quadratic using any method. Leave your answer in radical form if it will not simplify further (in other words, no decimals):

$$\begin{aligned} & -3x^2 - 3x - 1 = 3x & a = -3 \\ & -3x^2 - 6x - 1 = 0 & b = -6 \\ & & c = -1 \end{aligned}$$

$$\begin{aligned} & \frac{6 \pm \sqrt{36 - 4(-3)(-1)}}{2(-3)} = \frac{6 \pm \sqrt{24}}{-6} \\ & = \frac{6 \pm 2\sqrt{6}}{-6} \end{aligned}$$

2 |

$$= \frac{3 \pm \sqrt{6}}{-3}$$

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ive for the roots of the quadratic using any method. Leave your answer in radical form if it will not
ify further (in other words, no decimals):

$$6x^2 - 8 = -2x$$

$$6x^2 + 2x - 8 = 0$$

$$\frac{-2 \pm \sqrt{4 - 4(6)(-8)}}{2(6)}$$

$$\frac{-2 \pm \sqrt{196}}{12} = \frac{-2 \pm 14}{12} = 1 \text{ and } -\frac{4}{3}$$

Factor the polynomial completely:

$$2x^6 - 32x^2$$

$$2x^2(x^4 - 16) \quad 2x^2(x^2 - 4)(x^2 + 4)$$

$$2x^2(x - 2)(x + 2)(x^2 + 4)$$

1) Factor the polynomial completely: $x^2 - 5x - 14$

$$(x - 7)(x + 2)$$

$$\begin{array}{r} 7 \\ -7 \\ -5 \end{array}$$

Factor the polynomial completely: $4x^2 - 14x - 8$

$$\begin{array}{r} -8 \\ \times \\ 1 \\ \hline -7 \end{array}$$

$$2(2x^2 - 7x - 4)$$

$$(2x^2 - 8x) + (x - 4)$$

$$2x(x - 4) + 1(x - 4)$$

$$2(2x + 1)(x - 4)$$

Find the GCF of $32x^3y^4z^7$ and $72xy^2z^8$



$$8xy^2z^7$$

14) A rocket was launched into the air from an initial height of 6 feet with an initial velocity of 7 feet per second. The height of the rocket in feet, h , is modeled by the following equation, where t is the time in seconds after the rocket was launched. $h(t) = -5t^2 + 7t + 6$

a. How long did it take for the rocket to hit the ground? Round to the nearest tenths place.

$$2 \text{ seconds}$$

b. How long does it take for the rocket to reach its maximum height? Round to the nearest tenths place.

$$0.7 \text{ seconds}$$

c. What was the maximum height of the rocket? Round to the nearest tenths place.

$$8.5 \text{ feet}$$

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5) A ball is thrown into the air from an initial height of 720 feet with an initial velocity of 135 feet per second. The height of the ball in feet, h , is modeled by the following equation, $h(t) = -16t^2 + 135t + 720$, where t is the time in seconds after the ball was thrown.

- a. What was the height of the ball 3 seconds after it was thrown?

981 feet

- b. How long did it take the ball to reach its highest point?

4.2 seconds

- c. What was the highest height of the ball?

1004.8 feet

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$$2(4)^2 - 16(4) + 33$$

Graph the function $f(x) = 2x^2 - 16x + 33$. Identify the following, make a table of 5 ordered pairs, and graph.

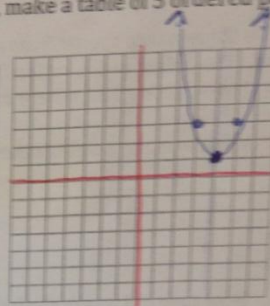
a. Vertex:

$$(4, 1)$$

$$\frac{16}{2(2)} = 4$$

$$\frac{16}{2(2)} = \frac{16}{4} = 4$$

x	y
2	9
3	3
4	1
5	3
6	9



b. Axis of Symmetry:

$$x = 4$$

c. x-intercept(s):

none

d. y-intercept:

$$(0, 33)$$

17) Graph the function $f(x) = 0.5(x-4)^2 - 2$

a. Vertex

$$(4, -2)$$

b. Axis of Symmetry

$$x = 4$$

c. x-intercept(s):

$$(2, 0) \quad (6, 0)$$

d. y-intercept:

$$(0, 6)$$

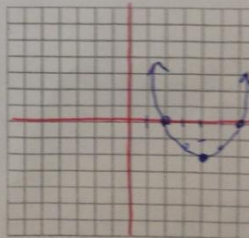
$$0 = 0.5(x-4)^2 - 2$$

$$2 = \frac{0.5(x-4)^2}{0.5}$$

$$\sqrt{4} = \sqrt{(x-4)^2}$$

$$\pm 2 = x - 4$$

x	y
2	0
3	-1.5
4	-2
5	-1.5
6	0



$$4 = (x-4)^2$$

$$4 \pm 2 = x$$

6 | 6 and 2