

Solution Station

Practice Assessment - Review | 2014

- 1) The cost of producing n pounds of candy at a factory is given by the polynomial $0.3n^2 + 4n + 12$. The cost of packaging is $0.2n^2 + 5n - 2$. Write and simplify an expression for the total cost of producing and packaging n pounds of candy.

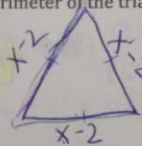
$$(0.3n^2 + 4n + 12) + (0.2n^2 + 5n - 2) = 0.5n^2 + 9n + 10$$

- 2) The volume of a box has a height of $x+1$, a width of $x-2$, and a length of $x-9$. Write an expression to represent the volume of the box. Distribute and combine the expression.

$$\begin{aligned} & (x+1)(x-2)(x-9) \\ & (x^2 - x - 2)(x-9) \\ & x^3 - x^2 - 2x - 9x^2 + 9x + 18 = x^3 - 10x^2 + 7x + 18 \end{aligned}$$

- 3) The length of an equilateral triangle is $x - 2$. What is the perimeter of the triangle? Write an expression to show the perimeter.

$$3(x-2) = 3x-6$$



- 4) The length of a rectangle is $2x + 3$. The width is $x+7$. Solve for x if the area of the rectangle is 90 square feet.

$$\begin{aligned} 90 &= (x+7)(2x+3) \\ 90 &= 2x^2 + 14x + 3x + 21 \\ 90 &= 2x^2 + 17x + 21 \end{aligned}$$

$$\begin{aligned} 90 &= 2x^2 + 17x + 21 \\ -90 & \quad -90 \\ \hline 0 &= 2x^2 + 17x - 69 \end{aligned}$$

$$0 = 2x^2 + 17x - 69$$

$$x = 3$$

- 5) Distribute and combine: $2(x^3 - 2x^2 + 4x - 2) - (4x^3 - 2x + 10)$

$$2x^3 - 4x^2 + 8x - 4 - 4x^3 + 2x - 10$$

$$-2x^3 - 4x^2 + 10x - 14$$

- 6) Simplify: $-3(x^2 - 4x + 2) + 2(x^2 - x - 3)$

$$-3x^2 + 12x - 6 + 2x^2 - 2x - 6$$

$$-x^2 + 10x - 12$$

$$(6x-12)(3x+2)$$

Practice Assessment - Review | 2014

7) Distribute and combine: $3(2x-4)(3x+2)$

$$3(6x^2 + 4x - 12x - 8) = 3(6x^2 - 8x - 8) \\ = 18x^2 - 24x - 24$$

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

$$x^3 + 3x^2 + x - 4x^2 - 12x - 4 \\ x^3 - x^2 - 11x - 4$$

9) Solve for the roots of the following quadratics using any method:

a. $x^2 + 4x = -4$

$$+4 \quad +4 \\ x^2 + 4x + 4 = 0 \\ (x+2)(x+2)$$

$$x = -2 \quad (-2, 0)$$

b. $5x^2 - 9x - 2 = 0$

$$\begin{array}{r} -10 \\ -10 \quad 1 \\ -9 \end{array}$$

$$5x^2 - 9x - 2 = 0 \\ (5x^2 - 10x) + (1x - 2) = 0 \\ 5x(x-2) + 1(x-2) \\ (5x+1)(x-2) = 0$$

$$5x+1=0 \\ 5x=-1 \\ x = -1/5$$

$$x-2=0 \\ x=2$$

c. $5x^2 + 9x - 2 = 0$

$$\frac{-9 \pm \sqrt{81 - 4(5)(-2)}}{2(5)} = \frac{-9 \pm \sqrt{121}}{10} = \frac{-9 \pm 11}{10}$$
$$\frac{-9+11}{10} = \frac{2}{10} = \frac{1}{5}$$
$$\frac{-9-11}{10} = \frac{-20}{10} = -2$$

d. $5x^2 - 11x + 2 = 0$

$$\begin{array}{r} 10 \\ -1 \quad -10 \\ -11 \end{array}$$

$$(5x^2 - x) + (10x + 2) \\ x(5x-1) + 2(5x-1) \\ (x-2)(5x-1)$$

$$x-2=0 \\ x=2$$
$$5x-1=0 \\ x=1/5$$

10) Factor the polynomial: $9x^2 - 81 = 9(x^2 - 9) = 9(x-3)(x+3)$

11) Factor the polynomial: $4x^6 - 64x^2 = 4x^2(x^4 - 16) = 4x^2(x^2 - 4)(x^2 + 4) = 4x^2(x-2)(x+2)(x^2 + 4)$

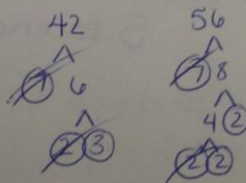
12) Factor the polynomial: $x^2 - 11x + 18$
 $(x-2)(x-9)$

13) Factor the polynomial: $3x^2 + 5x - 2$
 $(3x^2 + 6x) - (x + 2)$
 $3x(x+2) - 1(x+2)$
 $(3x-1)(x+2)$

14) Find the zeros of the polynomial: $x^2 - 11x + 10 = 0$
 $(x-10)(x-1) = 0$
 $x=10, x=1$

15) What is the GCF of $42x^5y^3z$ and $56x^2yz^5$?

$14x^2yz$



$7 \cdot 2 = 14$

16) A rocket was launched into the air from an initial height of 5 feet with an initial velocity of 3 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. $h(t) = -5t^2 + 3t + 5$

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

$$\frac{-b}{2a} = \left(\frac{1}{5}\right) \quad 5.5 \text{ feet}$$

- b. How long does it take for the rocket to reach its maximum height?

$$0.3 \text{ seconds}$$

- c. How long did it take the rocket to hit the ground?

$$1.3 \text{ seconds}$$

17) A ball is thrown into the air from an initial height of 896 feet with an initial velocity of 160 feet per second. The height of the ball in feet, h , is modeled by the following equation, $h(t) = -16t^2 + 160t + 896$, where t is the time in seconds after the ball was thrown.

- a. What was the height of the ball 9 seconds after it was thrown?

$$1040 \text{ feet}$$

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

$$1296 \text{ feet}$$

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

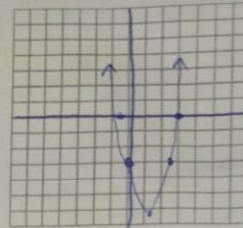
$$5 \text{ seconds}$$

18) Graph the function $f(x) = 2x^2 - 5x - 3$. Identify the following, make a table of 5 ordered pairs, and graph.

a. Vertex: $\frac{-b}{2a} = \frac{5}{4}$

$(5/4, -6 1/8)$ $a=2$ $b=-5$ $c=-3$

x	y
-0.5	0
0	-3
1.25	-6 1/8
2.5	-3
3	0



b. Axis of Symmetry:

$x = 5/4$

c. x-intercept(s):

$(-0.5, 0)$ and $(3, 0)$

d. y-intercept:

$(0, -3)$

19) Graph the function $f(x) = -(x-2)^2 + 4$

a. Vertex

$(2, 4)$

b. Axis of Symmetry

$x = 2$

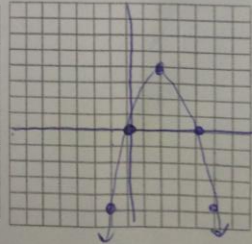
c. x-intercept(s):

$(4, 0)$ and $(0, 0)$

d. y-intercept:

$(0, 0)$

x	y
-1	-5
0	0
2	4
4	0
5	-5



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

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

$$\frac{-4}{-1} = \frac{-(x-2)^2}{-1}$$

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

$$\pm 2 = x - 2$$

$$2 \pm 2 = x$$

$$x = 4 \text{ and } x = 0$$

$$y = -(0-2)^2 + 4$$

$$y = -4 + 4 = 0$$

$$y = 0$$