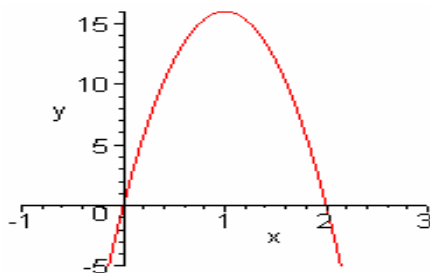


MA 107 INTERMEDIATE ALGEBRA
-A JUST IN TIME APPROACH-
PRACTICE TEST THREE

Sections: 4.1, 4.2, 4.3, 4.4, 4.5



1. Refer to the graph of $f(x) = -16x^2 + 32x$ in the figure. [4.1]



- Find the x-intercept points.
- Find the y-intercept point.
- Find the equation for the axis of symmetry.
- Find the vertex.
- Solve $9 = -16x^2 + 32x$.
- What is the range of $f(x)$.



2. In the following exercise, use the first and second differences to find out whether each sequence may be described with a linear function, a quadratic function, or neither. If a linear function may be used, fit an equation, $y = m x + b$.

If a quadratic function may be used, fit an equation with the difference method.

Check with calculator regression. [4.2]

- a. 8, 15, 26, 41, 60.....
- b. 1, 4, 9, 16, 25.....
- c. 1, 16, 81, 256, 625.....
- d. 4, 3, 2, 1, 0.....

3. Enter data as years since 1964-that is, (0, 61.9), (4, 60.9), etc. [4.2]

Voter Turnout Since 1964

Year	1964	1968	1972	1976	1980
Percent	61.9	60.9	55.2	53.5	52.8
Year	1984	1988	1992	1996	2000
Percent	53.3	50.3	55.2	49.0	50.3

Source: Sidlow and Henschen, *America at Odds*, Wadsworth, 2002, p.213.



- a) Fit a linear regression equation and explain what it says about an election in 2008 (44 years after 1964). Round answers to three nonzero digits.
- b) Use quadratic regression to fit an equation to the data.



4. Make a table and graph $f(x) = x^2 - 5x + 6$. [4.1]

- a. Solve $x^2 - 5x + 6 = 12$
- b. Solve $x^2 - 5x + 6 = 0$

- c. Solve $x^2 - 5x + 6 = -5$
- d. Find the equation for the axis of symmetry.
- e. What are the coordinates of the vertex?
- f. What are the domain and range for $f(x)$?
- g. Identify the coordinates of the x-and y-intercepts points from the table.

5. In the following exercise, add or subtract the polynomials. [4. 3]

a) $4x - 3x^2 - (7x + 2x^2 + 8)$

b) $5y - 3(y + 1) - 14 - 2y$

c) $a^2 - a + 1 - a^2 + a + 1$

6. Multiply the expressions in the following exercises. [4. 3, 4.4]

a. $(7-3t)(4t-9)$

b. $-3m(2m-3n)^2$

c. $(a+11b)(a-11b)$

d. $2ab(2a-3)$

e. $-(5xy+2)^2$

f. $2x^2y^3(4xy^4 - 2x^2y - 3x^3y^2)$

g. $4(y-5)^2$



7. Solve by factoring. [4.3, 4.4, 4.5]

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

b) $3x^2 + 7x + 2 = 0$

c) $30x^2 - 17x + 1 = 0$

d) $x^2 = -18x - 45$

e) $-16x^2 + 32x = 0$

f) $-2x^2 = -60x$

g) $-12x^2 + 55x = 63$

h) $x^2 - 3x = 18$

i) $4x^2 - 121 = 0$

j) $16x^2 - 1 = 0$

k) $16x^2 - 9$

8. Fill in the numbers that make the expressions equal to binomial squares. [4.4]

a) $x^2 - \underline{\hspace{1cm}} + 25$

b) $y^2 + 9y + \underline{\hspace{1cm}}$

9. Find a if the graph of the equation is to pass through the given point. [4.5]

a. The graph of $y = a(x+3)(x+1)$ passes through $(-4, -6)$.

b. The graph of $y = a(x-5)(x-1)$ passes through $(-1, -12)$

10. In the following exercise, use the factored equation method to write a quadratic equation passing through the points. Check with a quadratic regression.

[4.2, 4.5]

$(-2, 0)$, $(-1, 10)$, $(3, 0)$.



11. Suppose that 60 feet of fencing is available to enclose a rectangular garden, one side of which will be against the side of a house. Determine the dimensions of the garden that will guarantee the largest area. [4.5]

12. What is the rule for this table? Explain which clues were most helpful in guessing. [4. 3]

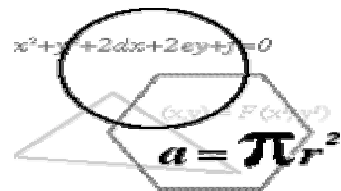
x	4	2	7	—	10	—
f(x)	—	7	52	4	103	67

13. Identify the following as a monomial, binomial, trinomial or not a polynomial [4. 3]

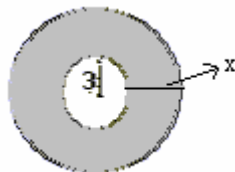
a) $a\sqrt{2} + \sqrt{5}$

b) $|y - 1|$

c) $y^2 - y + 1 - y^2 + y + 1$



14. Suppose the circle shown in the figure contains another circle of the same shape. The area of such a circle is πr^2 . Write an expression for the shaded area. Factor the expression.



Answers:

1a) (0, 0), (2, 0); b) (0, 0); c) $x = 1$; d) Vertex: (1,16); e) { 0.34, 1.66}; f) $y \leq 16$.

2a)quadratic : $y = 2x^2 + x + 5$

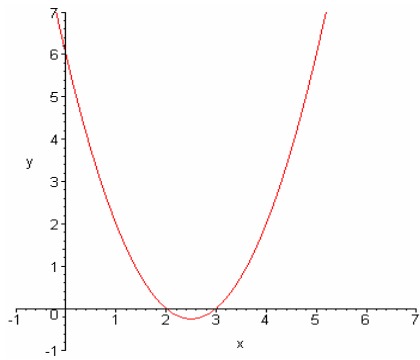
b)quadratic : $y = x^2$

c)neither

d)linear : $y = -x + 5$

3 $y = -0.298x + 59.6$; Voter turnout will decline to 46.5%.

b) $y = 0.0111x^2 - 0.697x + 61.7$



x	y
-1	12
0	6
1	2
2	0
3	0
4	2
5	6

4)

a) {-1,6} b) {2,3}

c) No solution d) $x = 2.5$ e) (2.5, -0.25)

f) All Reals; $y \geq -0.25$ g) x-intercept points (2,0), (3,0) , y-intercept point (0,6)

5a) $-5x^2 - 3x - 8$

b) -17

c)2

6a) $-12t^2 + 55t - 63$

b) $-12m^3 + 36m^2n - 27n^2m$

c) $a^2 - 121b^2$

d) $4a^2b - 6ab$

e) $-25x^2y^2 - 20xy - 4$

f) $8x^3y^7 - 4x^4y^4 - 6x^5y^5$

g) $4y^2 - 40y + 100$

$$7a)(x-2)^2 = 0 \rightarrow \{2\}$$

$$b)(x+2)(3x+1) = 0 \rightarrow \{-2, -1/3\}$$

$$c)(15x-1)(2x-1) = 0 \rightarrow \{1/15, 1/2\}$$

$$d)(x+3)(x+15) = 0 \rightarrow \{-15, -3\}$$

$$e) -16x(x-2) = 0 \rightarrow \{0, 2\}$$

$$f) -2x(x-30) = 0 \rightarrow \{0, 30\}$$

$$g)(7-3x)(4x-9) = 0 \rightarrow \{9/4, 7/3\}$$

$$h)(x+3)(x-6) = 0 \rightarrow \{-3, 6\}$$

$$i)(2x+11)(2x-11) = 0 \rightarrow \{-11/2, 11/2\}$$

$$j)(4x-1)(4x+1) = 0 \rightarrow \{-1/4, 1/4\}$$

$$k)(4x+3)(4x-3) = 0 \rightarrow \left\{ \frac{-3}{4}, \frac{3}{4} \right\}$$

$$8a)x^2 - 10x + 25 = (x-5)^2$$

$$b)y^2 + 9y + \frac{81}{4} = \left(y + \frac{9}{2}\right)^2$$

$$9a) a = -2, b) a = -1. \quad 10) -2.5x^2 + 2.5x + 15$$

$$11) A(x) = x(60 - 2x); x = \text{width} = 15 \text{ ft}, y = \text{length} = 30 \text{ ft}.$$

12)

x	4	2	7	<u>1</u>	10	<u>8</u>
f(x)	<u>19</u>	7	52	4	103	67

$$f(x) = x^2 + 3 \quad ; \text{ Correlation coefficient (quadratic regression) } r = 1.$$

13a) binomial b) not a polynomial c) monomial.

$$14. \pi(x+3)^2 - 9\pi = \pi x(x+6)$$