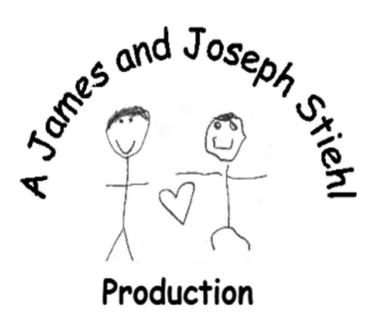
-Presents-

ALGEBRA II

REGENTS EXAM REVIEW MANUAL

WITH 8 REGENTS EXAMS, 6 TOPICALLY ORGANIZED



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1. Evaluate j(-1) given

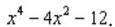
$$j(x) = 2x^4 - x^3 - 35x^2 + 16x + 48.$$

Explain what your answer tells you about x+1 as a factor.



Algebraically find the remaining zeros of f(x).

2. Over the set of integers, factor the expression





3. Which expression is equivalent to $x^6y^4(x^4-16)-9(x^4-16)$?

1)
$$x^{10}y^4 - 16x^6y^4 - 9x^4 - 144$$

2)
$$(x^6y^4 - 9)(x+2)^3(x-2)$$

3)
$$(x^3y^2 + 3)(x^3y^2 - 3)(x + 2)^2(x - 2)^2$$

4)
$$(x^3y^2 + 3)(x^3y^2 - 3)(x^2 + 4)(x^2 - 4)$$

08 2018 14



4. The roots of the equation $3x^2 + 2x = -7$ are

1)
$$-2, -\frac{1}{3}$$

3)
$$-\frac{1}{3} \pm \frac{2i\sqrt{5}}{3}$$

2)
$$-\frac{7}{3}$$
, 1

4)
$$-\frac{1}{3} \pm \frac{\sqrt{11}}{3}$$

08 2018 09



5. Which expression is equivalent to

$$\frac{2x^4 + 8x^3 - 25x^2 - 6x + 14}{x + 6}$$
?

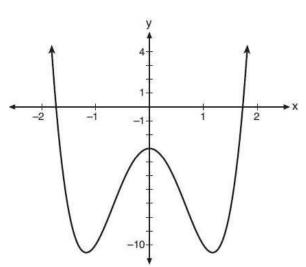
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- 1) $2x^3 + 4x^2 + x 12 + \frac{86}{x+6}$
- 2) $2x^3 4x^2 x + 14$
- 3) $2x^3 4x^2 x + \frac{14}{x+6}$
- 4) $2x^3 4x^2 x$

6. Consider the function $p(x) = 3x^3 + x^2 - 5x$ and the graph of y = m(x) below.





Which statement is true?

- p(x) has three real 3) roots and m(x) has two real roots.
- p(x) has two real roots and m(x) has three real roots.
- p(x) has one real root
 and m(x) has two real roots.
- p(x) has three real roots and m(x) has four real roots.
- 7. If $f(x) = x^2 + 9$ and g(x) = x + 3, which operation would not result in a polynomial expression?



- 1) f(x) + g(x)
- 3) $f(x) \cdot g(x)$
- 2) f(x) g(x)
- 4) $f(x) \div g(x)$

8. Determine the quotient and remainder When $(6a^3 + 11a^2 - 4a - 9)$ is divided by (3a - 2).

06 2018 29

Express your answer in the form $q(a) + \frac{r(a)}{d(a)}$.

9. Given the following polynomials

$$x = (a+b+c)^{2}$$
$$y = a^{2} + b^{2} + c^{2}$$
$$z = ab + bc + ac$$





Which identity is true?

$$1) \quad x = y - z$$

3)
$$x = y - 2z$$

2)
$$x = y + z$$

4)
$$x = y + 2z$$

10. Which equation represents a parabola with a focus of (-2,5) and a directrix of y = 9?



1)
$$(y-7)^2 = 8(x+2)^2$$

1)
$$(y-7)^2 = 8(x+2)$$
 3) $(x+2)^2 = 8(y-7)$
2) $(y-7)^2 = -8(x+2)$ 4) $(x+2)^2 = -8(y-7)$

2)
$$(y-7)^2 = -8(x+2)$$

1)
$$(x+2)^2 = -8(y-7)$$

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Polynomial Expressions and Equations

11. The profit function, p(x), for a company is the cost function, c(x), subtracted from the revenue function, r(x). The profit function for the Acme Corporation is

06 2018 13

 $p(x) = -0.5x^2 + 250x - 300$ and the revenue function is $r(x) = -0.3x^2 + 150x$.

The cost function for the Acme Corporation is

1)
$$c(x) = 0.2x^2 - 100x + 300$$
 3) $c(x) = -0.2x^2 + 100x - 300$

2)
$$c(x) = 0.2x^2 + 100x + 300$$
 4) $c(x) = -0.8x^2 + 400x - 300$

12. If x-1 is a factor of $x^3 - kx^2 + 2x$, what is the value of k?



3) 3

2) 2

4) -3



13. Which expression can be rewritten as (x+7)(x-1)?

1)
$$(x+3)^2-16$$

2)
$$(x+3)^2 - 10(x+3) - 2(x+3) + 20$$

3)
$$\frac{(x-1)(x^2-6x-7)}{(x+1)}$$

4)
$$\frac{(x+7)(x^2+4x+3)}{(x+3)}$$

06 2018 08



14. The graphs of the equations $y = x^2 + 4x - 1$ and y + 3 = x are drawn on the same set of axes. One solution of this system is



$$2)$$
 $(-1,-4)$

15. On a set of axes, sketch a possible Function p(x) = (x - a)(x - b)(x + c), where a, b, and c are positive, a > b, and p(x) has a positive y-intercept of d. Label all intercepts.



16. Verify the following Pythagorean identity for all values of *x* and *y*:

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



08 2017 27

17. Which binomial is *not* a factor of the expression $x^3 - 11x^2 + 16x + 84$?

1)
$$x + 2$$

3)
$$x - 6$$

2)
$$x + 4$$

4)
$$x - 7$$

08 2017 20



Which expression has been rewritten 18. correctly to form a true statement?



1)
$$(x+2)^2 + 2(x+2) - 8 = (x+6)x$$

2)
$$x^4 + 4x^2 + 9x^2y^2 - 36y^2 = (x + 3y)^2(x - 2)^2$$

3)
$$x^3 + 3x^2 - 4xy^2 - 12y^2 = (x - 2y)(x + 3)^2$$

4)
$$(x^2-4)^2-5(x^2-4)-6=(x^2-7)(x^2-6)$$

19. Which expression is equivalent to

$$\frac{4x^3 + 9x - 5}{2x - 1}$$
, where $x \neq \frac{1}{2}$?



1)
$$2x^2 + x + 5$$
 3) $2x^2 - x + 5$

3)
$$2x^2 - x + 5$$

2)
$$2x^2 + \frac{11}{2} + \frac{1}{2(2x-1)}$$
 4) $2x^2 - x + 4 + \frac{1}{2x-1}$

A polynomial equation of degree three, 20. p(x), is used to model the volume of a rectangular box. The graph of p(x) has x intercepts at -2, 10, and 14. Which statements regarding p(x) could be true?



- A. The equation of p(x) = (x-2)(x+10)(x+14).
- B. The equation of p(x) = -(x+2)(x-10)(x-14).
- C. The maximum volume occurs when x = 10.
- D. The maximum volume of the box is approximately 56.

- 1) A and C
- 3) B and C
- 2) A and D
- 4) B and D
- What are the zeros of $P(m) = (m^2 4)(m^2 + 1)$? 21.



- 1) 2 and -2, only 3) -4, i, and -i
- 2) 2, -2, and -4 4) 2, -2, i, and -i
- 22. Which equation represents a parabola with the focus at (0,-1) and the directrix of y = 1?



- 1) $x^2 = -8y$
- 3) $x^2 = 8y$
- 2) $x^2 = -4y$
- 4) $x^2 = 4y$
- Over the set of integers, factor the 23. expression $4x^3 - x^2 + 16x - 4$ completely.



Given $r(x) = x^3 - 4x^2 + 4x - 6$, find the value 24. of r(2). What does your answer tell you about x-2 as a factor of r(x)? Explain.



The expression $\frac{-3x^2-5x+2}{x^3+3x^2}$ can be 25. rewritten as



1)
$$\frac{-3x-3}{x^2+2x}$$

$$\frac{-3x-3}{x^2+2x}$$
 3) $-3x^{-1}+1$

$$\frac{-3x-1}{x^2}$$

2)
$$\frac{-3x-1}{x^2}$$
 4) $-3x^{-1} + x^{-2}$

Mallory wants to buy a new window air 26. conditioning unit. The cost for the unit is \$329.99. If she plans to run the unit three months out of the year for an annual operating cost of \$108.78, which function models the cost per year over the lifetime of the unit, C(n), in terms of the number of years, n, that she owns the air conditioner.



1)
$$C(n) = 329.99 + 108.78n$$

$$C(n) = 329.99 + 326.34n$$

3)
$$C(n) = \frac{329.99 + 108.78n}{n}$$

4)
$$C(n) = \frac{329.99 + 326.34n}{n}$$

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Polynomial Expressions and Equations

27. A parabola has its focus at (1, 2) and its directrix is y = -2. The equation of this parabola could be



1)
$$y = 8(x+1)^2$$

2)
$$y = \frac{1}{8} (x+1)^2$$

3)
$$y = 8(x-1)^2$$

4)
$$y = \frac{1}{8}(x-1)^2$$

28. Which binomial is a factor of $x^4 - 4x^2 - 4x + 8$?



1)
$$x-2$$

3)
$$x-4$$

2)
$$x + 2$$

4)
$$x + 4$$

29. A manufacturing company has developed a cost model, $C(x) = 0.15x^3 + 0.01x^2 + 2x + 120$, where x is the number of items sold, in thousands. The sales price can be modeled by S(x) = 30 - 0.01x. Therefore, revenue is modeled by $R(x) = x \cdot S(x)$. The company's profit, P(x) = R(x) - C(x), could be modeled by



1)
$$0.15x^3 + 0.02x^2 - 28x + 120$$

2)
$$-0.15x^3 - 0.02x^2 + 28x - 120$$

3)
$$-0.15x^3 + 0.01x^2 - 2.01x - 120$$

4)
$$-0.15x^3 + 32x + 120$$