

PreCalc 12 Chapter 1 Review 2017 v1 Answer Section

MULTIPLE CHOICE

1. ANS: C
Difference of squares

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge
2. ANS: A
Difference of squares

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge
3. ANS: C
Draw exemplars to prove or disprove each statement.

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions KEY: Conceptual Understanding
4. ANS: A
Remainder theorem, substitute $P(-(+ 2))$

PTS: 0 DIF: Easy REF: 1.2 Factoring Polynomials
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge
5. ANS: B
Factor property, + 5 is only a factor of + 185

PTS: 0 DIF: Easy REF: 1.2 Factoring Polynomials
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge
6. ANS: D
Factor property, test values should be factors of + 9

PTS: 0 DIF: Easy REF: 1.2 Factoring Polynomials
LOC: 12.RF11 TOP: Relations and Functions KEY: Conceptual Understanding
7. ANS: A
Look at degree and leading coefficient.

PTS: 0 DIF: Easy REF: 1.4 Relating Polynomial Functions and Equations
LOC: 12.RF12 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

8. ANS: D
Substitute

PTS: 0 DIF: Easy REF: 1.2 Factoring Polynomials
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

9. ANS: C PTS: 0 DIF: Easy REF: 1.3 Graphing Polynomial Functions
LOC: 12.RF12 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

10. ANS: D
Look at the highest power

PTS: 0 DIF: Easy REF: 1.4 Relating Polynomial Functions and Equations
LOC: 12.RF12 TOP: Relations and Functions KEY: Conceptual Understanding

11. ANS: D PTS: 0 DIF: Easy
REF: 1.5 Modelling and Solving Problems with Polynomial Functions
LOC: 12.RF12 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

12. ANS: A PTS: 0 DIF: Easy
REF: 1.5 Modelling and Solving Problems with Polynomial Functions
LOC: 12.RF12 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

13. ANS: C PTS: 0 DIF: Easy
REF: 1.5 Modelling and Solving Problems with Polynomial Functions
LOC: 12.RF12 TOP: Relations and Functions KEY: Procedural Knowledge

14. ANS: D
Factor, synthetic or long division

PTS: 0 DIF: Moderate REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

15. ANS: C
Re-order first, Pad with zeroes if necessary then synthetic or long division

PTS: 0 DIF: Moderate REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

16. ANS: A
Pad with zeroes if necessary then synthetic or long division

PTS: 0 DIF: Moderate REF: 1.1 Dividing a Polynomial by a Binomial
LOC: 12.RF11 TOP: Relations and Functions
KEY: Conceptual Understanding | Procedural Knowledge

17. ANS: A
Draw exemplars to prove or disprove each statement.

PTS: 0 DIF: Moderate REF: 1.3 Graphing Polynomial Functions
LOC: 12.RF12 TOP: Relations and Functions KEY: Conceptual Understanding

18. ANS: A

Use factor theorem, $P(-+ 5) = 0$.

PTS: 0 DIF: Moderate REF: 1.1 Dividing a Polynomial by a Binomial

LOC: 12.RF11 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

19. ANS: D

Factor theorem, test $P(x)$ for $+ 3$, $- 3$, $+ 5$, and $- 5$. Answers for short answer: $x+ 3$, $x+ 5$, $x- 8$, and $x+ 1$

PTS: 0 DIF: Moderate REF: 1.2 Factoring Polynomials

LOC: 12.RF11 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

20. ANS: D

PTS: 0 DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

21. ANS: A

Leave equation in factored form.

Domain should be at least the smaller of 9 and 11

Range should be at least the maximum of the volumes.

PTS: 0 DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

22. ANS: C

Find original volume first

PTS: 0 DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

23. ANS: B

Pad with zeroes if necessary then long division, can't use synthetic.

If using synthetic, must divide remainder by $b = -1$.

PTS: 0 DIF: Difficult REF: 1.1 Dividing a Polynomial by a Binomial

LOC: 12.RF11 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

24. ANS: A

Use factor theorem to test

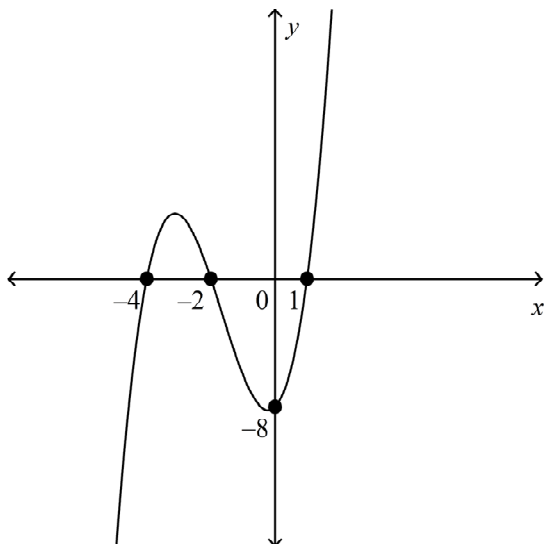
PTS: 0 DIF: Difficult REF: 1.2 Factoring Polynomials

LOC: 12.RF11 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

SHORT ANSWER

25. ANS:



PTS: 0 DIF: Easy REF: 1.4 Relating Polynomial Functions and Equations
 LOC: 12.RF12 TOP: Relations and Functions
 KEY: Procedural Knowledge | Communication

26. ANS:

Just use the given answer and put in variable

$$2x^2 - 7x + 104 = (x - 1)(2x - 5) + 99$$

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
 LOC: 12.RF11 TOP: Relations and Functions
 KEY: Conceptual Understanding | Procedural Knowledge

27. ANS:

Just use the given answer and put in variable

The quotient is $5x^3 - 10x^2 + x - 11$ and the remainder is 54.

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
 LOC: 12.RF11 TOP: Relations and Functions
 KEY: Conceptual Understanding | Procedural Knowledge

28. ANS:

Just use the given answer and put in variable

The quotient is $-5x^4 + 16x^3 - 23x^2 - 3x + 16$ and the remainder is -80 .

PTS: 0 DIF: Easy REF: 1.1 Dividing a Polynomial by a Binomial
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29. ANS:

Number of x -intercepts	Number of hills	Number of valleys	y -intercept
3	1	1	-5

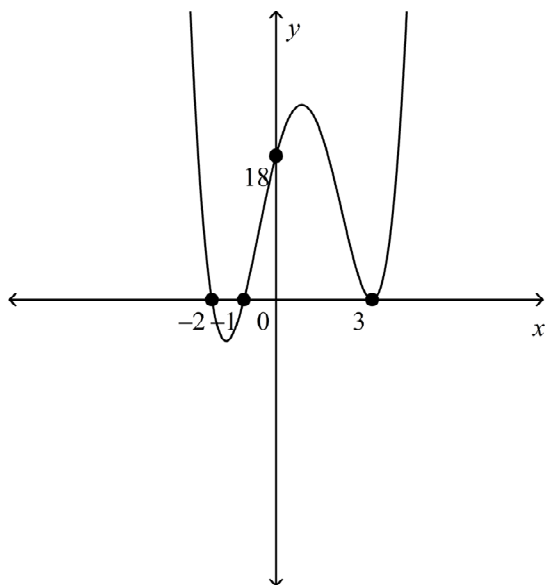
PTS: 0 DIF: Easy REF: 1.3 Graphing Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Communication

30. ANS:

-1 if missing labels



PTS: 0 DIF: Moderate REF: 1.4 Relating Polynomial Functions and Equations

LOC: 12.RF12 TOP: Relations and Functions KEY: Procedural Knowledge

31. ANS:

Use factor property then factor theorem

 $x + 4$ or $x - 5$

-1 if factors not listed.

PTS: 0 DIF: Moderate REF: 1.2 Factoring Polynomials

LOC: 12.RF11 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

32. ANS:

Use factor property then factor theorem

 $x - 1$, $x - 3$, or $3x - 1$

-1 if factors not listed.

PTS: 0 DIF: Moderate REF: 1.2 Factoring Polynomials

LOC: 12.RF11 TOP: Relations and Functions

KEY: Conceptual Understanding | Procedural Knowledge

33. ANS:

Use the given equation. -.5 if missing units. -.5 if incorrect rounding.

Maximum volume: approximately 432.9 cm^3

Side length of square: approximately 2.9 cm

PTS: 0 DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

34. ANS:

Recall: $V = \pi r^2 h$. -.5 if missing units. -.5 if incorrect rounding.

Both the radius and height are approximately 5.4 cm.

PTS: 0 DIF: Difficult

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Problem-Solving Skills

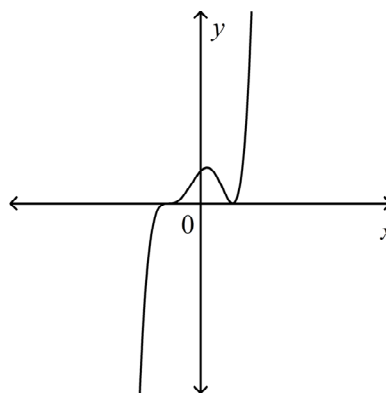
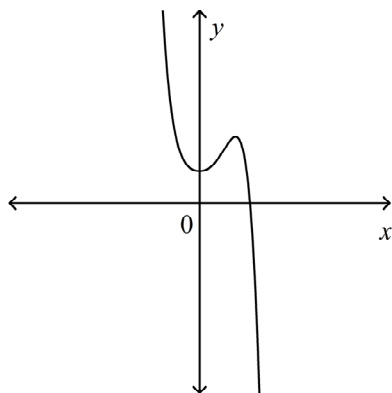
PROBLEM

35. ANS:

a)

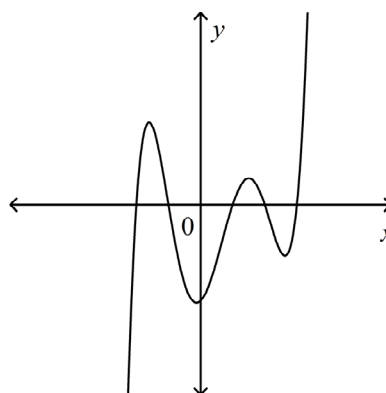
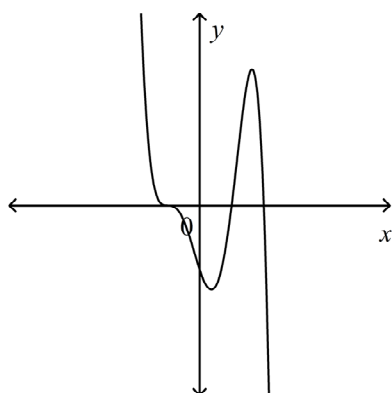
i) $f(x) = -x^5 + x^4 + x^2 + 1$

ii) $g(x) = x^5 + x^4 - 2x^3 - 2x^2 + x + 1$



iii) $h(x) = -2x^5 + 8x^3 + 4x^2 - 6x - 4$

iv) $j(x) = x^5 - 3x^4 - 5x^3 + 15x^2 + 4x - 12$



b)

Graph	Number of x-intercepts	Number of hills	Number of valleys	y-intercept
i	1	1	1	1
ii	2	1	1	1
iii	3	1	1	-4
iv	5	2	2	-12

PTS: 0 DIF: Moderate REF: 1.3 Graphing Polynomial Functions
 LOC: 12.RF12 TOP: Relations and Functions
 KEY: Procedural Knowledge | Communication

36. ANS:

The student should have identified a in $x - a$ as -2 .

The correct solution is:

$$\text{Let } P(x) = x^3 - 4x^2 + 6x - 2$$

When $P(x)$ is divided by $x + 2$, the remainder is $P(-2)$.

$$P(-2) = (-2)^3 - 4(-2)^2 + 6(-2) - 2$$

$$= (-8) - 4(4) + 6(-2) - 2$$

$$= -8 - 16 - 12 - 2$$

$$= -38$$

The remainder is -38 .

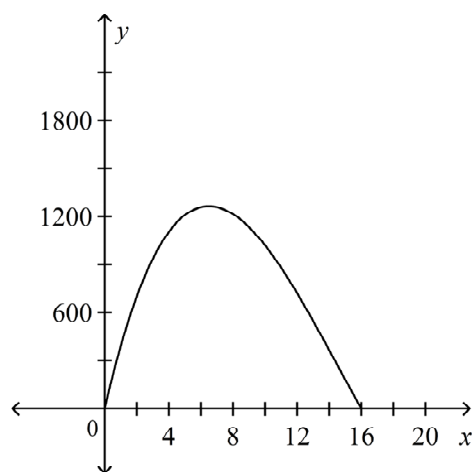
PTS: 0 DIF: Moderate REF: 1.2 Factoring Polynomials

LOC: 12.RF11 TOP: Relations and Functions

KEY: Procedural Knowledge | Communication

37. ANS:

-.5 if missing units, -.5 if incorrect rounding.

a) Factor the polynomial: $x^3 - 43x^2 + 432x$ First remove x as a common factor: $x^3 - 43x^2 + 432x = x(x^2 - 43x + 432)$ Then factor the trinomial: $x^2 - 43x + 432$ The width is $16 - x$, so $16 - x$ is a factor.Determine the other factor: $27 - x$ $x^3 - 43x^2 + 432x = x(16 - x)(27 - x)$ The length of the box is $(27 - x)$ centimetres and the height is x centimetres.b) Enter the equation $y = x^3 - 43x^2 + 432x$ into a graphing calculator.Sketch a graph of the function over the domain $0 < x < 16$.The x -intercepts represent the values of x for which the volume of the box is 0 cm^3 .c) To determine the coordinates of the local maximum point, press: $\boxed{2\text{ND}} \boxed{\text{TRACE}} \boxed{4}$, then use the arrow keys. The y -coordinate of the local maximum point is approximately 1266. So, the maximum volume of the box is approximately 1266 cm^3 .

PTS: 0

DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

38. ANS:

-.5 if not stating twins' age, -.5 if small mistakes in equation.

Let Ben's age in years to be x .

Then, in years, Cheryl's age is $x + 3$ and Gina's age is $x + 3$.

The sum of their ages is: $x + (x + 3) + (x + 3) = 3x + 6$

Product of ages – sum of ages = 4809

So, $x(x + 3)(x + 3) - (3x + 6) = 4809$

$$x^3 + 6x^2 + 6x - 4815 = 0$$

Use a graphing calculator to graph $y = x^3 + 6x^2 + 6x - 4815$.

The x -intercept is 15, which is Ben's age.

So, the twins are $15 + 3$, or 18 years old.

PTS: 0

DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

39. ANS:

-.5 if not stating all ages, -.5 if small mistakes in equation.

Let Kara's age in years be x .

Then Leon's age in years is $x + 4$, Max's age in years is $x - 3$, and Norma's age in years is $x - 5$.

The sum of their ages is: $x + (x + 4) + (x - 3) + (x - 5) = 4x - 4$

Product of ages – sum of ages = 59 912

So, $x(x + 4)(x - 3)(x - 5) - (4x - 4) = 59 912$

$$x(x + 4)(x - 3)(x - 5) - (4x - 4) - 59 912 = 0$$

$$x(x + 4)(x - 3)(x - 5) - 4x - 59 908 = 0$$

Use a graphing calculator to graph the equation $y = x(x + 4)(x - 3)(x - 5) - 4x - 59 908$.

Age cannot be negative, so the positive x -intercept, which is 17, represents Kara's age.

So, Kara was 17 years old on that day.

The ages of the other friends, in years, were:

Leon: $17 + 4 = 21$

Max: $17 - 3 = 14$

Norma: $17 - 5 = 12$

On January 9, 2011, Leon was 21, Max was 14, Norma was 12, and Kara was 17.

PTS: 0

DIF: Moderate

REF: 1.5 Modelling and Solving Problems with Polynomial Functions

LOC: 12.RF12 TOP: Relations and Functions

KEY: Procedural Knowledge | Communication | Problem-Solving Skills

40. ANS:

Pad with zeroes if necessary then long division

$$-6x^4 + 25x^3 - 25x^2 + 10x - 31 = (2x - 5)(-3x^3 + 5x^2 + 5) - 6$$

PTS: 0

DIF: Difficult

REF: 1.1 Dividing a Polynomial by a Binomial

41. ANS:

Factor the polynomial. Use the factor theorem. -1 if missing possible factors.

Use mental math. When $x = -1$, $f(-1) = 0$ So, $x + 1$ is a factor of $f(x) = 2x^4 - 7x^3 - 2x^2 + 13x + 6$.

Divide to determine the other factor.

$$\begin{array}{r|rrrrr}
 -1 & 2 & -7 & -2 & 13 & 6 \\
 & & -2 & 9 & -7 & -6 \\
 \hline
 & 2 & -9 & 7 & 6 & 0
 \end{array}$$

So, $2x^4 - 7x^3 - 2x^2 + 13x + 6 = (x + 1)(2x^3 - 9x^2 + 7x + 6)$

Factor the cubic polynomial. Use the factor theorem.

Let $g(x) = 2x^3 - 9x^2 + 7x + 6$ When $x = 2$, $g(2) = 0$ So, $x - 2$ is a factor.

Divide to determine the other factor.

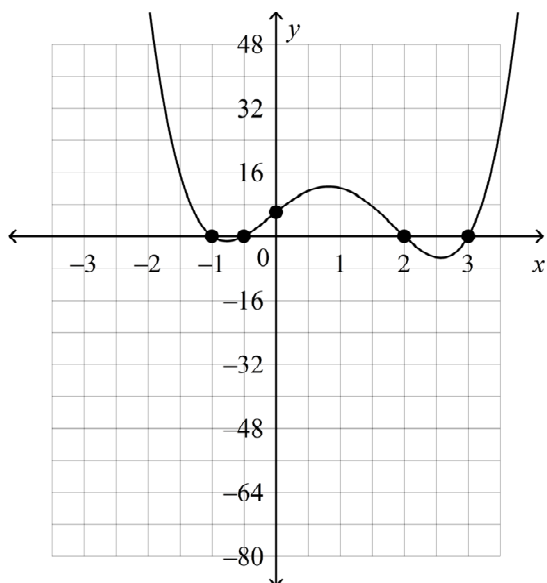
$$\begin{array}{r|rrrr}
 2 & 2 & -9 & 7 & 6 \\
 & & 4 & -10 & -6 \\
 \hline
 & 2 & -5 & -3 & 0
 \end{array}$$

So, $2x^3 - 9x^2 + 7x + 6 = (x - 2)(2x^2 - 5x - 3)$ Factor the trinomial: $2x^2 - 5x - 3 = (x - 3)(2x + 1)$ So, $2x^4 - 7x^3 - 2x^2 + 13x + 6 = (x + 1)(x - 2)(x - 3)(2x + 1)$ The zeros of the function are: $-1, 2, 3, -\frac{1}{2}$ The x -intercepts of the graph are: $-1, 2, 3, -\frac{1}{2}$

The equation has degree 4, so it is an even-degree polynomial function.

The leading coefficient is positive, so the graph opens up.

The constant term is 6, so the y -intercept is 6.A graph of $f(x) = 2x^4 - 7x^3 - 2x^2 + 13x + 6$ is:



PTS: 0 DIF: Difficult REF: 1.4 Relating Polynomial Functions and Equations
LOC: 12.RF12 TOP: Relations and Functions
KEY: Procedural Knowledge | Communication