For students entering Pre-calculus and Honors Pre-calculus

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. **Use U = universal set = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 2, 3, 5, 8}, B = {2, 3, 5, 7}, and C = {1, 4, 9} to find the set.**

$B \cup C$

a. {0}
b. {1, 2, 3, 5, 7, 9}
c. {1, 2, 3, 4, 5, 7, 9}
d. { }

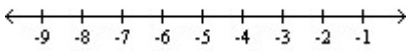
____ 2. **Use U = universal set = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {1, 2, 3, 5, 8}, B = {2, 3, 5, 7}, and C = {1, 4, 9} to find the set.**

$\overline{A \cup B}$

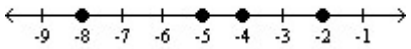
a. {1, 4, 6, 8, 9}
b. {4, 6, 9}
c. {0, 4, 6, 9}
d. {1, 2, 3, 5, 7, 8}

____ 3. **On the real number line, label the points with the given coordinates.**

-8, -6, -4, -2



a.



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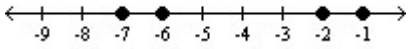

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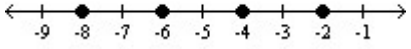

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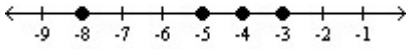


____ 4. **Replace the question mark by <, >, or =, whichever is correct.**

-95 ? -38

a. >
b. <
c. =

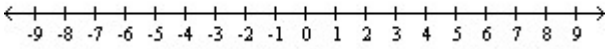
____ 5. **Write the statement as an inequality.**

y is greater than -97

a. $y > -97$
b. $y \geq -97$
c. $y \leq -97$
d. $y < -97$

____ 6. **Graph the numbers on the real number line.**

$x < 6$



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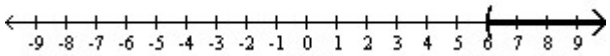

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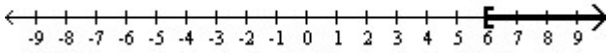

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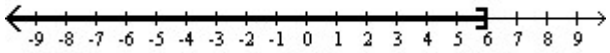

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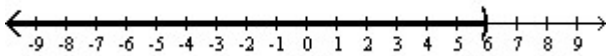
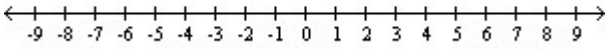
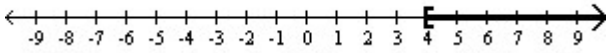


____ 7. **Graph the numbers on the real number line.**

$x \geq 4$



a.



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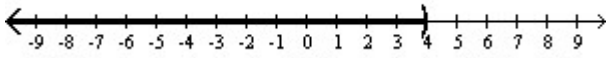

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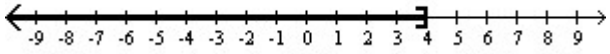

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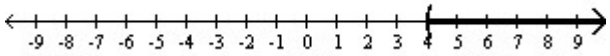
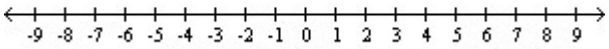
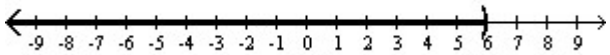


____ 8. **Graph the numbers on the real number line.**

$x \leq 6$



a.



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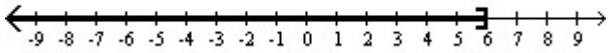

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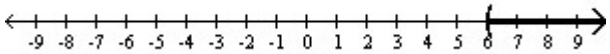

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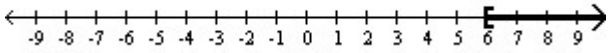
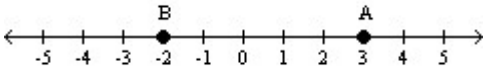


____ 9. **Use the given real number line to compute the distance.**

Find d(A, B)



a. -5
b. 4
c. 5
d. 6

____ 10. **Evaluate the expression using the given values.**

$-6x + y$ $x = 4, y = 2$

a. 6
b. -22
c. -4
d. 26

____ 11. **Evaluate the expression using the given values.**

$\frac{|x|}{x} + \frac{|y|}{y}$ $x = 5$ and $y = -1$

a. 0
b. -1
c. 1
d. 2

____ 12. **Evaluate the expression using the given values.**

$4|x| + 5|y|$ $x = 2, y = -3$

a. -23
b. 7
c. -7
d. 23

____ 13. **Express the statement as an equation involving the indicated variables.**

The circumference C of a circle is the product of π and its diameter d.

a. $C = \pi + d$
b. $C = 2\pi d$
c. $C = \frac{\pi}{d}$
d. $C = \pi d$

____ 14. **Solve the problem.**

At the beginning of the month, Christopher had a balance of $217 in his checking account. During the next month, he wrote a check for $33, deposited $84, and wrote another check for $174. What was his balance at the end of the month?

a. -$74
b. $74
c. -$94
d. $94

____ 15. **Determine which value(s), if any, must be excluded from the domain of the variable in the expression.**

$$\frac{8x - 9}{x^2 - 81}$$

a. $x = \frac{9}{8}$
b. x = 81
c. x = 9
d. x = 9, x = -9

____ 16. **Determine which value(s), if any, must be excluded from the domain of the variable in the expression.**

$$\frac{x - 5}{3}$$

a. x = 5
b. none
c. x = -5
d. x = 0

____ 17. **Determine which value(s), if any, must be excluded from the domain of the variable in the expression.**

$$\frac{x - 9}{3 - x}$$

a. x = 3
b. none
c. x = 3, x = 9
d. x = -3

____ 18. **Simplify the expression.**

-5^3
a. 15
b. -125
c. 125
d. -15

____ 19. **Simplify the expression.**

$(-5)^{-2}$
a. 25
b. $-\frac{1}{25}$
c. $\frac{1}{25}$
d. -25

____ 20. **Simplify the expression.**

$3^{-7} \cdot 3^6$
a. 1
b. $\frac{1}{3}$
c. 3
d. $\frac{1}{9}$

____ 21. **Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.**

$(6xy)^2$

a. $\frac{1}{36x^2y^2}$

c. $36x^2y^2$

b. $36xy$

d. $6x^2y^2$

____ 22. **Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.**

$(x^{-5}y)^3$

a. $\frac{y^3}{x^{15}}$

c. $x^{15}y^3$

b. $\frac{y^3}{x^5}$

d. $\frac{1}{x^{15}y^3}$

____ 23. **Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.**

$\frac{x^{-9}y^5}{x^3y^{12}}$

a. $\frac{x^{12}}{y^7}$

c. $\frac{y^7}{x^{12}}$

b. $\frac{1}{x^{12}y^7}$

d. $x^{12}y^7$

____ 24. **Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.**

$(x^{-6}y^6)^{-7}z^9$

a. $\frac{y^{42}z^9}{x^{42}}$

c. $\frac{x^{42}}{y^{42}z^9}$

b. $\frac{y^{42}}{x^{42}z^9}$

d. $\frac{x^{42}z^9}{y^{42}}$

____ 25. **Simplify the expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.**

$\left(\frac{-4x^4y^{-6}}{3z^7}\right)^{-1}$

a. $\frac{3y^6}{-4x^4z^7}$

c. $\frac{3y^6z^7}{-4x^4}$

b. $\frac{-4x^4}{3y^6z^7}$

d. $\frac{3z^7}{-4x^4y^6}$

____ 26. **Evaluate the expression using the given value of the variables.**

$4x^2 + 2y^2$ for $x = 2$, $y = 3$

a. 26

c. 22

b. -2
d. 34

____ 27. **Evaluate the expression using the given value of the variables.**

y^x for x = -3, y = 3

a. $\frac{1}{27}$
c. -27

b. $-\frac{1}{27}$
d. 27

____ 28. **Find the value of the expression using the given values.**

$(\sqrt{x})^2$ for x = 3

a. 3
c. 9

b. $\frac{1}{9}$
d. $\frac{1}{3}$

____ 29. **Find the value of the expression using the given values.**

$\sqrt{x^2 + y^2}$ for x = 12, y = 16

a. 11
c. 20

b. 19
d. 14

____ 30. **Find the value of the expression using the given values.**

$\sqrt{x^2} + \sqrt{y^2}$ for x = 6, y = 8

a. 2
c. 14

b. -2
d. 100

____ 31. **Use a calculator to evaluate the expression. Round the answer to three decimal places.**

$-(0.23)^{-1}$

a. -0.230
c. 4.348

b. 0.230
d. -4.348

____ 32. **The lengths of the legs of a right triangle are given. Find the hypotenuse.**

a = 5, b = 12

a. 13
c. 4

b. 169
d. 10

____ 33. **The lengths of the legs of a right triangle are given. Find the hypotenuse.**

a = 9, b = 12

a. 15
c. 8

b. 14
d. 11

____ 34. **The lengths of the sides of a triangle are given. Determine if the triangle is a right triangle. If it is, identify the hypotenuse.**

10, 24, 26

a. right triangle; 26
b. right triangle; 24
c. not a right triangle
d. right triangle; 10

____ 35. **The lengths of the sides of a triangle are given. Determine if the triangle is a right triangle. If it is, identify the hypotenuse.**

14, 48, 50
a. right triangle; 14
b. right triangle; 50
c. not a right triangle
d. right triangle; 48

____ 36. **Solve the problem.**

Find the area A of a rectangle with length 3.4 m and width 8.8 m.
a. $A = 13.6\ m^2$
b. $A = 59.84\ m^2$
c. $A = 12.2\ m^2$
d. $A = 29.92\ m^2$

____ 37. **Solve the problem.**

Find the area A and circumference C of a circle of radius 2 yd. Express the answer in terms of π.
a. $A = 4\pi\ yd^2$; $C = 4\pi$ yd
b. $A = 8\pi\ yd^2$; $C = 2\pi$ yd
c. $A = 16\pi\ yd^2$; $C = 2\pi$ yd
d. $A = 4\pi\ yd^2$; $C = 4\pi$ yd

____ 38. **Solve the problem.**

Find the volume V of a rectangular box with length 2 yd, width 5 yd, and height 4 yd.
a. $V = 80\ yd^3$
b. $V = 40\ yd^3$
c. $V = 16\ yd^3$
d. $V = 50\ yd^3$

____ 39. **Solve the problem.**

Find the surface area S of a rectangular box with length 5 ft, width 2 ft, and height 4 ft.
a. $76\ ft^2$
b. $38\ ft^2$
c. $56\ ft^2$
d. $68\ ft^2$

____ 40. **Solve the problem.**

Find the volume V and surface area S of a sphere of radius 12 centimeters. Express the answer in terms of π.
a. $V = 1728\pi\ cm^3$; $S = 144\pi\ cm^2$
b. $V = 576\pi\ cm^3$; $S = 2304\pi\ cm^2$
c. $V = 2304\pi\ cm^3$; $S = 576\pi\ cm^2$
d. $V = 6912\pi\ cm^3$; $S = 36\pi\ cm^2$

____ 41. **Solve the problem.**

Find the volume V of a sphere of radius 2 yd. Use 3.14 for π. If necessary, round the result to the nearest tenth.
a. $V = 18.8\ yd^3$
b. $V = 267.9\ yd^3$
c. $V = 16.7\ yd^3$
d. $V = 33.5\ yd^3$

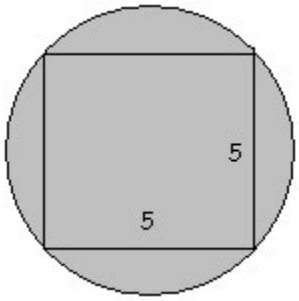
____ 42. **Solve the problem.**

Find the volume V of a sphere of diameter 6 m. Use 3.14 for π. If necessary, round the result to the nearest tenth.

a. $V = 113\ m^3$
b. $V = 37.7\ m^3$
c. $V = 904.3\ m^3$
d. $V = 63.6\ m^3$

____ 43. **Solve the problem.**

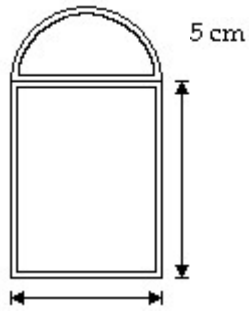
Find the area of the shaded region. Express the answer in teems of π.



a. $\frac{25}{2}$ square units
b. $\frac{25}{4}\pi$ square units
c. 5π square units
d. $\frac{25}{2}\pi$ square units

____ 44. **Solve the problem.**

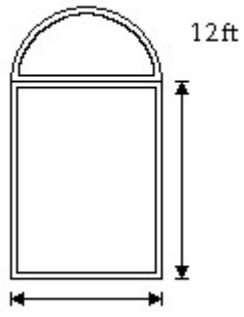
Find the perimeter. Approximate the result to the nearest tenth using 3.14 for π.



a. 17.7 cm
b. 22.4 cm
c. 20.7 cm
d. 25.4 cm

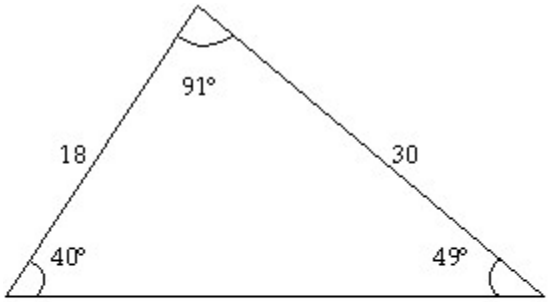
____ 45. **Solve the problem.**

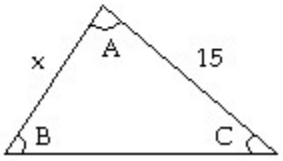
Find the area of the window. Approximate the result to the nearest tenth using 3.14 for π.



a. 54.3 ft^2
b. 73.1 ft^2
c. 51.1 ft^2
d. 98.2 ft^2

____ 46. **The triangles are similar. Find the missing length x and the missing angles A, B, C.**





a. x = 9 units; A = 91°; B = 40°; C = 49°
b. x = 18 units; A = 40°; B = 91°; C = 49°
c. x = 9 units; A = 49°; B = 40°; C = 91°
d. x = 18 units; A = 91°; B = 40°; C = 49°

____ 47. **Solve. If necessary, round to the nearest tenth.**

A flagpole casts a shadow of 22 feet. Nearby, a 10-foot tree casts a shadow of 3 feet. What is the height of the flagpole?

a. 73.3 ft
b. 6.6 ft
c. 660 ft
d. 1.4 ft

____ 48. **Solve. If necessary, round to the nearest tenth.**

The zoo has hired a landscape architect to design the triangular lobby of the children's petting zoo. In his scale drawing, the longest side of the lobby is 17 cm. The shortest side of the lobby is 3 cm. The longest side of the actual lobby will be 46 m. How long will the shortest side of the actual lobby be?

a. 260.7 m
b. 8.1 m
c. 0.1 m
d. 2.6 m

____ 49. **Tell whether the expression is a monomial. If it is, name the variable(s) and coefficient, and give the degree of the monomial.**

$16x^9$

a. Monomial; variable x; coefficient 9; degree 0
b. Monomial; variable x; coefficient 9; degree 16
c. Not a monomial
d. Monomial; variable x; coefficient 16; degree 9

____ 50. **Tell whether the expression is a monomial. If it is, name the variable(s) and coefficient, and give the degree of the monomial.**

$-4xy^7$

a. Not a monomial
b. Monomial; variables x, y; coefficient -4; degree 8
c. Monomial; variables x, y; coefficient -4; degree 7
d. Monomial; variables x, y; coefficient -4; degree 1

____ 51. **Tell whether the expression is a polynomial. If it is, give its degree.**

$7z^6 + z$

a. Polynomial; degree 7
b. Not a polynomial
c. Polynomial; degree 6
d. Polynomial; degree 1

____ 52. **Add, subtract, or multiply, as indicated. Express your answer as a single polynomial in standard form.**

$8(1 - y^3) + 5(1 + y + y^2 + y^3)$

a. $3y^3 + 5y^2 + 5y + 13$
b. $-3y^3 + 5y^2 + 5y + 13$
c. $-3y^3 - 5y^2 + 5y - 13$
d. $-3y^3 + 5 - ay^2 + 5y + 13$

____ 53. **Add, subtract, or multiply, as indicated. Express your answer as a single polynomial in standard form.**

$8x^2(x^3 - x + 5)$

a. $8x^6 - 8x^3 + 40x^2$
b. $8x^5 - 8x^3 + 40$
c. $8x^5 + 8x^3 + 40x^2$
d. $8x^5 - 8x^3 + 40x^2$

____ 54. **Add, subtract, or multiply, as indicated. Express your answer as a single polynomial in standard form.**

$(4x - 11)(x - 4)$

a. $4x^2 - 27x + 44$
b. $x^2 - 27x - 28$
c. $4x^2 - 28x + 44$
d. $x^2 + 44x - 27$

____ 55. **Multiply the polynomials using the special product formulas. Express the answer as a single polynomial in standard form.**

$(x + 3)^2$

a. $9x^2 + 6x + 9$
b. $x^2 + 6x + 9$
c. $x^2 + 9$
d. $x + 9$

____ 56. **Multiply the polynomials using the special product formulas. Express the answer as a single polynomial in standard form.**

$(7x + 11)^2$

a. $49x^2 + 121$
b. $7x^2 + 154x + 121$
c. $49x^2 + 154x + 121$
d. $7x^2 + 121$

____ 57. **Multiply the polynomials using the special product formulas. Express the answer as a single polynomial in standard form.**

$(9x - 11)^2$

a. $9x^2 + 121$
b. $81x^2 + 121$
c. $81x^2 - 198x + 121$
d. $9x^2 - 198x + 121$

____ 58. **Find the quotient and the remainder.**

$48x^2 + 42x - 11$ divided by $6x$

a. $8x + 7$; remainder -11
c. $8x^2 + 7x - \frac{11}{6}$; remainder 0
b. $8x - 4$; remainder 0
d. $48x + 42$; remainder -11

____ 59. **Find the quotient and the remainder.**

$x^4 + 256$ divided by $x - 4$

a. $x^3 + 4x^2 + 16x + 64$; remainder 256
c. $x^3 + 4x^2 + 16x + 64$; remainder 0
b. $x^3 - 4x^2 + 16x - 64$; remainder 512
d. $x^3 + 4x^2 + 16x + 64$; remainder 512

____ 60. **Find the quotient and the remainder.**

$-25x^3 + 5x^2 + 22x + 17$ divided by $-5x - 3$

a. $5x^2 - 4x - 2$; remainder 11
c. $5x^2 - 4x - 2$; remainder 0
b. $x^2 - 2$; remainder -4
d. $5x^2 - 4x - 2$; remainder 14

____ 61. **Find the quotient and the remainder.**

$x^4 + 6x^2 + 7$ divided by $x^2 + 1$

a. $x^2 + 5x + \frac{1}{2}$; remainder 0
c. $x^2 + 5$; remainder 0
b. $x^2 + 5$; remainder 2
d. $x^2 + 5x + 1$; remainder 2

____ 62. **Find the quotient and the remainder.**

$x^2 - 169a^2$ divided by $x - 13a$

a. $x - 13a$
c. $x^2 - 26xa$
b. $x + 13a$
d. $x^2 + 26xa$

____ 63. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$9x^2 - 1$

a. $(3x - 1)^2$
c. $(3x - 1)(3x + 1)$
b. $(3x + 1)^2$
d. prime

____ 64. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^3 - 1000$

a. $(x - 10)(x^2 + 100)$
c. $(x - 10)(x^2 + 10x + 100)$
b. $(x + 10)(x^2 - 10x + 100)$
d. $(x + 1000)(x^2 - 1)$

____ 65. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$36x^2 + 84x + 49$

a. $(6x - 8)^2$
c. $(6x - 7)^2$
b. $(6x + 7)^2$
d. $(6x + 7)(6x - 7)$

____ 66. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^2 - x - 6$

a. $(x + 1)(x - 6)$
c. $(x + 3)(x - 2)$

b. $(x + 2)(x - 3)$ d. prime

____ 67. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$2x^2 - 2x - 12$

a. $2(x - 2)(x + 3)$ c. $2(x + 2)(x - 3)$
b. prime d. $(2x + 4)(x - 3)$

____ 68. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^4 - 16$

a. $(x^2 + 4)(x + 2)(x - 2)$ c. $(x^2 + 4)^2$
b. $(x^2 - 4)^2$ d. prime

____ 69. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$x^9 + 1$

a. $(x^3 + 1)(x^6 - x^3 + 1)$ c. $(x + 1)(x^2 - x + 1)(x^6 - x^3 + 1)$
b. $(x - 1)(x + 1)(x^6 - x^3 + 1)$ d. $(x - 1)(x^2 + x + 1)(x^6 + x^3 + 1)$

____ 70. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$729x^4 - x$

a. $x(9x - 1)(81x^2 + 1)$ c. $x(729x - 1)(x^2 + 9x + 1)$
b. $x(9x + 1)(81x^2 - 9x + 1)$ d. $x(9x - 1)(81x^2 + 9x + 1)$

____ 71. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$(5 - x)^3 - x^3$

a. $(5 + 2x)(x^2 - 5x + 25)$ c. $(5 - 2x)(3x^2 - 5x + 25)$
b. $(5 - x)(x^2 - 5x + 25)$ d. $(5 - 2x)(x^2 - 5x + 25)$

____ 72. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$14x^2 - 49x - 28$

a. prime c. $7(2x - 1)(x + 4)$
b. $(14x - 7)(x + 4)$ d. $7(2x + 1)(x - 4)$

____ 73. **Factor completely. If the polynomial cannot be factored, say it is prime.**

$24x^2 + 78x + 45$

a. $3(15x + 5)(x + 3)$ c. $3(2x + 5)(4x + 3)$
b. $(2x + 1)(4x + 15)$ d. $3(2x + 1)(4x + 15)$

____ 74. **An expression that occurs in calculus is given. Factor completely.**

$2(x + 6)(x - 5)^3 + (x + 6)^2 \bullet 6(x - 5)^2$

a. $2(x + 5)(x - 6)^2(4x + 13)$ c. $(x + 6)(x - 5)^2(8x + 26)$
b. $2(x + 6)(x - 5)^2(4x + 13)$ d. $(x + 6)(x - 5)^2(4x + 13)$

____ 75. **Use synthetic division to find the quotient and the remainder.**

$x^2 + 8x + 8$ is divided by $x + 6$

a. x + 2; remainder 4
b. x + 3; remainder 0
c. x + 2; remainder 0
d. x + 2; remainder -4

____ 76. **Use synthetic division to determine whether x - c is a factor of the given polynomial.**

$x^3 - 4x^2 - 39x + 126$; $x + 6$

a. No
b. Yes

____ 77. **Use synthetic division to determine whether x - c is a factor of the given polynomial.**

$x^3 - 9x^2 + 8x + 64$; $x + 6$

a. No
b. Yes

____ 78. **Use synthetic division to determine whether x - c is a factor of the given polynomial.**

$4x^3 - 37x^2 + 19x + 168$; $x + 5$

a. No
b. Yes

____ 79. **Use synthetic division to determine whether x - c is a factor of the given polynomial.**

$6x^5 - 5x^4 + x - 4$; $x + \frac{1}{2}$

a. Yes
b. No

____ 80. **Reduce the rational expression to lowest terms.**

$$\frac{4x^2 - 37x + 63}{x - 7}$$

a. $4x - 9$
b. $\frac{1}{x - 7}$
c. $4x^2 - 46$
d. $\frac{4x^2 - 37x + 63}{x - 7}$

____ 81. **Reduce the rational expression to lowest terms.**

$$\frac{x^2 + 14x + 49}{x^2 + 16x + 63}$$

a. $\frac{x + 7}{x + 9}$
b. $\frac{14x + 7}{16x + 9}$
c. $\frac{14x + 49}{16x + 63}$
d. $-\frac{x^2 + 14x + 49}{x^2 + 16x + 63}$