Honors Math 2
Review April 12

Name Key
Period_____ Date_____

1. What is the vertex of the graph of $y = \frac{1}{4}(x-2)^2 + 6$?

V: (2, 6)

A. (0, 7) B. (2, 6) C. (-2, -6) D. (4, 7) E. (-2, 6)

2. What is a correct factorization of $x^2 + 6x - 16$?

1·16
2·8
4·4

A. $(x+8)(x-2)$ B. $(x+4)(x-4)$
C. $(x-8)(x-2)$ D. $(x-4)(x-4)$
E. $(x-8)(x+2)$

3. What are the solutions of $2x^2 - 3 = 13$?

$2x^2 - 3 = 13$
$2x^2 = 16$
$x^2 = 8$
$x = \pm\sqrt{8}$

A. $\pm\sqrt{2}$ B. $\pm 2\sqrt{2}$ C. $2\sqrt{2}$ D. ± 2 E. $-\sqrt{2}$

4. What is the simplified form of the expression $\sqrt{162}$?

81·2

A. $3\sqrt{18}$ B. $3\sqrt{54}$ C. $9\sqrt{18}$ D. $\sqrt{3}\sqrt{54}$ E. $9\sqrt{2}$

5. What does the product $(-5-2i)(3+7i)$ equal?

$(-5-2i)(3+7i)$
$-15 - 35i - 6i - 14i^2$
$-15 - 41i + 14$
$-1 - 41i$

A. $-15 - 14i^2$ B. $-1 - 41i$
C. $-29 - 41i$ D. $-1 + 41i$
E. $-29 + 41i$

use graphing calculator

6. What is the factorization of $f(x) = 2x^3 - x^2 - 5x - 2$? if $x-2$ is a factor

A. $(x-2)(2x+1)(x+1)$ B. $(x-2)(2x-1)(x+1)$
C. $(x-2)(2x+1)(x-1)$ D. $(x-2)(2x-1)(x-1)$
E. $(x+2)(2x+1)(x-1)$

2	2	-1	-5	-2
	↓	4	6	2
	2	3	1	0

$2x^2 + 3x + 1$

$(x-2)(2x+1)(x+1)$

use graphing calculator

7. What are all the rational zeros of $f(x) = x^3 + 3x^2 - 13x - 15$? if $x-3$ is a factor

A. -3, -1, 5 B. -3, 1, 5

C. -5, -1, 3 D. -5, 1, 3

E. -1, 3, 5

$$\begin{array}{r|rrrr} 3 & 1 & 3 & -13 & -15 \\ & \downarrow & 3 & 18 & 15 \\ \hline & 1 & 6 & 5 & 0 \end{array}$$

$x^2 + 6x + 5$

$(x-3)(x+5)(x+1)$

$x = -5, -1$ $x = 3$

use graphing calculator

8. What are all the real zeros of $f(x) = x^4 + 2x^3 + x^2 - 4$?

A. $-2, -1$ B. $-2, 1$

C. $-1, 2$ D. $1, 2$

E. $\pm 1, \pm 2$

9. How many zeros does the function $f(x) = -3x^4 + 2x^3 + 7x - 5$ have?

A. 1 B. 2 C. 3 D. 4 E. 5

10. Which quadratic function in vertex form has a graph with the vertex $(-3,-6)$ and passes through the point $(2,-31)$?

A. $y = -(x+3)^2 + 6$ B. $y = (x+3)^2 - 6$

C. $y = -(x+3)^2 - 6$ D. $y = -(x-3)^2 - 6$

E. $y = (x+3)^2 + 6$

$y = a(x-h)^2 + K$

$y = a(x+3)^2 - 6$

substitute point to find "a"

$-31 = a(2+3)^2 - 6$

$-25 = a(5)^2$

$-25 = 25a$

$a = -1$

11. What is the simplified expression of $\left(\dfrac{2x^{-3}}{3y^{-4}}\right)^{-2}$?

A. $\dfrac{2x^6}{3y^8}$ B. $\dfrac{3y^8}{2x^6}$ C. $\dfrac{9y^6}{4x^5}$ D. $\dfrac{9y^8}{4x^6}$ E. $\dfrac{9x^6}{4y^8}$

$\left(\dfrac{3y^{-4}}{2x^{-3}}\right)^2 = \dfrac{9y^{-8}}{4x^{-6}} = \dfrac{9x^6}{4y^8}$

12. What is the value of $f(x) = -8x^5 + 6x^4 - 5x^3 + 10x^2 + 9x - 1$ when $x = -1$?

A. 11 B. -9 C. 7 D. -11 E. 19

$-8(-1)^5 + 6(-4)^4 - 5(-1)^3 + 10(-1)^2 + 9(-1) - 1$ or

-1	-8	6	-5	10	9	-1
	↓	8	-14	19	-29	20
	-8	14	-19	29	-20	$\boxed{19}$

remainder

13. What is the result of dividing $3x^3 + 7x^2 + 5$ by $x + 1$?

A. $3x^2 + 10x + 10 + \frac{15}{x+1}$ B. $3x^2 + 4x + 4 + \frac{1}{x+1}$

C. $3x^2 - 10x + 10 - \frac{15}{x+1}$ D. $3x^2 - 4x - 4 + \frac{9}{x+1}$

E. $3x^2 + 4x - 4 + \frac{9}{x+1}$

$$\begin{array}{r|rrrr} -1 & 3 & 7 & 0 & 5 \\ & \downarrow & -3 & -4 & 4 \\ \hline & 3 & 4 & -4 & 9 \end{array}$$

$3x^2 + 4x - 4 + \frac{9}{x+1}$

or

$$\begin{array}{r} 3x^2 + 4x - 4 \\ x+1 \overline{\big) 3x^3 + 7x^2 + 0x + 5} \\ -3x^3 + -3x^2 \\ \hline 4x^2 + 0x \\ -4x^2 + -4x \\ \hline -4x + 5 \\ +4x + 4 \\ \hline 9 \end{array}$$

14. Which cubic function is graphed?

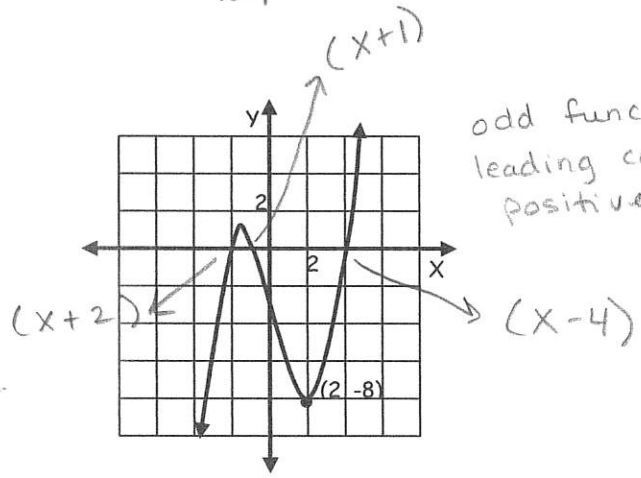
~~A. $f(x) = \frac{1}{3}(x-1)(x+2)(x-4)$~~

~~B. $f(x) = -\frac{1}{3}(x+1)(x+2)(x+4)$~~

C. $f(x) = \frac{1}{3}(x+1)(x+2)(x-4)$

~~D. $f(x) = 3(x-1)(x-2)(x+4)$~~

~~E. $f(x) = \frac{1}{3}(x+1)(x+2)(x+4)$~~



odd function
leading coefficient
positive

15. What is the value of $-64^{1/3}$?

$-\sqrt[3]{64} = -4$

A. 4 B. -4 C. $\frac{1}{4}$ D. $-\frac{1}{4}$ E. $\pm\frac{1}{4}$

Graph on calculator to check

16. Which of the following is an exponential decay function?

$y = a(b)^x$ decay $\Rightarrow b < 1$

A. $f(x) = 4\left(\frac{2}{3}\right)^{-x}$ $4\left(\frac{3}{2}\right)^x$ growth

B. $f(x) = 3^x$ growth

C. $f(x) = 7\left(\frac{2}{5}\right)^{-x}$ $7\left(\frac{5}{2}\right)^x$ growth

D. $f(x) = 2(5)^{-x}$ $2\left(\frac{1}{5}\right)^x$ decay

E. $f(x) = 8\left(\frac{8}{3}\right)^x$ growth

17. What is the simplified form of $5e^{-8} \bullet (-2e^3)^2$?

$5e^{-8} \cdot 4e^6 = 20e^{-2} = \frac{20}{e^2}$

A. $-10e^{-40}$ B. $-20e^2$ C. $\frac{20}{e^2}$ D. $\frac{20}{e^{48}}$ E. $\frac{10}{e^2}$

18. What is $f(-3)$ where $f(x) = \frac{50}{1+7e^{-x}}$?

$\Rightarrow f(x) = \frac{50}{1+7e^{-(-3)}} = \frac{50}{1+7e^3}$

A. 0.3342 B. 0.3487

C. 0.3531 D. 0.3672

E. 0.3915

Factor 1st

$(x-11)(x+4)$ $(x+9)(x+8)$

19. What is the product $\frac{x^2-7x-44}{x^2+6x-16} \bullet \frac{x^2+17x+72}{x^2-2x-99}$?

$(x+8)(x-2)$ $(x-11)(x+9)$

A. $\frac{x+9}{x-2}$ B. $\frac{x-2}{x+4}$ C. $\frac{x+4}{x-2}$ D. $\frac{x-11}{x+9}$ E. $\frac{x+8}{x-2}$

Factor 1st

$(x-5)(x+2)$

20. What is the product $\frac{x^2-3x-10}{x^2-6x+5} \bullet \frac{x-1}{x^2-4}$?

$(x-5)(x-1)$ $(x+2)(x-2)$

A. $x-2$ B. $\frac{1}{x-2}$ C. $x+2$ D. $\frac{1}{x+2}$ E. $\frac{x-1}{x-2}$

21. What are all the solutions of the equation $\frac{-6}{x+7} = \frac{x}{2}$?

$(x+7)(2)$ $(2)(x+7)$

$2(-6) = x(x+7)$
$-12 = x^2 + 7x$
$0 = x^2 + 7x + 12$
$0 = (x+4)(x+3)$
$x = -4, -3$

A. 3, 4 B. -3, 4 C. -4 D. -3 E. -4, -3

Factor & then LCD

22. What is the difference $\frac{x+4}{x^2+6x+9} + \frac{-1}{x^2-9}$?

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

LCD: $(x+3)^2(x-3)$

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

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

$\frac{x^2 - 15}{(x+3)^2(x-3)}$

A. $\frac{x^2 - x - 15}{(x+3)^2(x-3)}$ B. $\frac{x^2 + x - 15}{(x+3)^2(x-3)}$

C. $\frac{x^2 - 15}{(x+3)^2(x-3)}$ D. $\frac{x^2 - 15}{(x-3)^2(x+3)}$

E. $\frac{x^2 + 15}{(x+3)^2(x-3)}$

23. What is the solution of the equation $\frac{6}{x} + \frac{-2}{3} = +\frac{-4}{x}$?

LCD: $3x$

$3(6) - 2(x) = -4(3)$
$18 - 2x = -12$
$-2x = -30$
$x = 15$

A. 15 B. -2 C. -15 D. 3 E. 6

24. What is the value of $25^{-3/2}$?

A. ± 125 B. $\frac{1}{125}$ C. 125 D. $-\frac{1}{125}$ E. $\pm\frac{1}{125}$

$$\frac{1}{25^{3/2}} = \frac{1}{(\sqrt{25})^3} = \frac{1}{5^3} = \frac{1}{125}$$