Algebra 2 Regents Review Packet #4

Key

The radical expression $\sqrt[3]{135x^4y^8}$ can be simplified to

$\sqrt[3]{27 \cdot 5 \cdot x^3 \cdot x \cdot y^6 \cdot y^2}$

$3xy^2\sqrt[3]{5xy^2}$

(1) $45xy^2\sqrt[3]{x}$

(2) $5x^2y\sqrt[3]{3y^2}$

(3) $3xy^2\sqrt[3]{27xy}$

(4) $3xy^2\sqrt[3]{5xy^2}$

Which of the following is equivalent to $ai^7 + bi^{16} - ci^{21}$, where a, b, and c are real numbers and $i = \sqrt{-1}$?

(1) $a + (b - c)i$

(2) $b - (a + c)i$

(3) $(a + c)i - b$

(4) $a - b + ci$

$a(-i) + b(1) - c(i)$

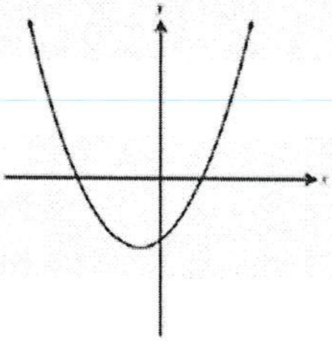
$-ai + b - ci$

$b - i(a + c)$

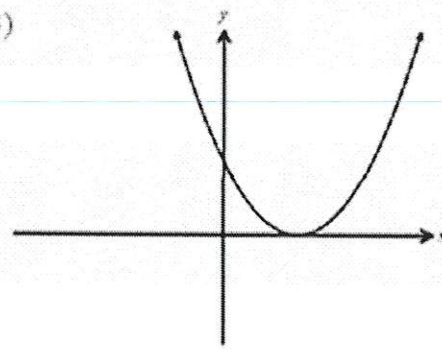
The function $f(x)$ is quadratic with the solutions to $f(x) = 0$ being $x = -2 \pm 3i$. Which of the following graphs could represent $f(x)$?

2 Imaginary Roots

(1)



(3)



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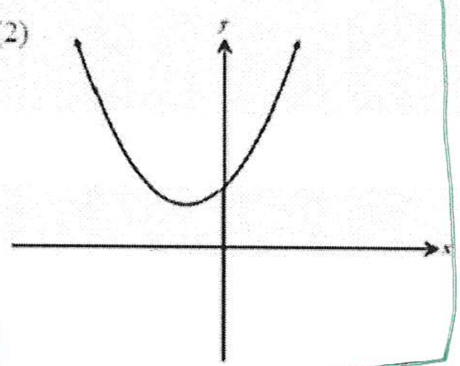

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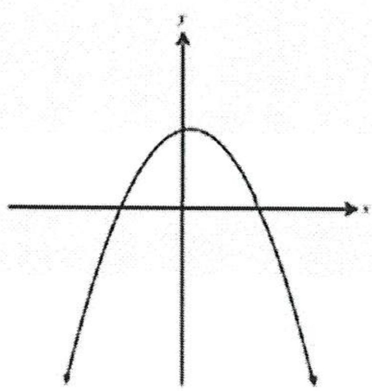


For which of the following values of b will the equation $4x^2 + bx + 7 = 0$ have real solutions?

cross x-axis!

(1) $b = 5$

(2) $b = 9$

(3) $b = -8$

(4) $b = -11$

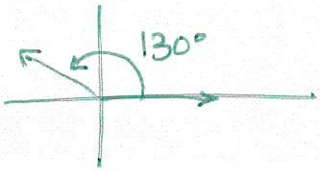
Which of the following angles is coterminal with an angle of 130°, assuming both angles are drawn in the standard position?

(1) 230°

(2) -230° (130°)

(3) 430° (70°)

(4) -310° (50°)



If $f(x)=10\sin(2x)+8$ then $f\left(\frac{\pi}{4}\right)=$?

$f\left(\frac{\pi}{4}\right)=10\sin\left(2\cdot\frac{\pi}{4}\right)+8=18$

RADIAN MODE

(1) $4\sqrt{2}$

(2) 8

(3) 18

(4) $28\sqrt{3}$

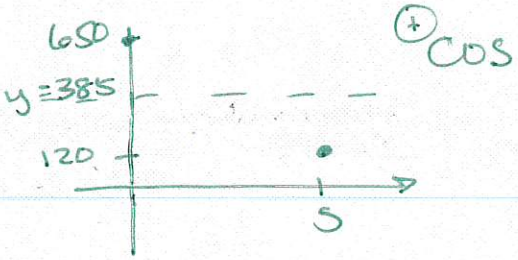
The volume of water in a tank varies periodically. At $t=0$ it is at its maximum of 650 gallons and at $t=5$ it is at its minimum of 120 gallons. Which of the following functions would best model the volume of water in this tank as a function of time in hours?

(1) $V=265\cos\left(\frac{2\pi}{10}t\right)+385$

(2) $V=-770\sin(10t)+385$

(3) $V=-385\cos(5t)+265$

(4) $V=265\sin\left(\frac{\pi}{10}t\right)+770$



If a sequence is defined by $c_1=15$ and $c_n=c_{n-1}+4$ then what is the value of the 20^{th} term of this sequence?

(1) 80

(2) 91

(3) 95

(4) 101

↑ $d=4$ Arith.

15, 19, 23...

$a_n=a_1+(n-1)d$

$a_{20}=15+19(4)=91$

Place the following quadratic function in $y=a(x-h)^2+k$. Identify the coordinates of its turning point.

$\frac{y}{3}-\frac{23}{3}+4=x^2-4x+4$

$\frac{y}{3}-\frac{7}{4}=(x-2)^2$

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

$y=3(x-2)^2+\frac{21}{4}$

$y=\frac{3}{3}x^2-\frac{12}{3}x+\frac{23}{3}$

TP: $\left(2,\frac{21}{4}\right)$

Which of the following values of x solves: $(0.5)^{3x+2}=8^{5x-4}$?

(1) $\frac{2}{3}$

(2) $\frac{5}{9}$

(3) 3

(4) 7

$\left(\frac{1}{2}\right)^{3x+2}=8^{5x-4}$

$(2^{-1})^{3x+2}=8^{5x-4}$

$(2)^{-3x-2}=(2^3)^{5x-4}$

$-3x-2=15x-12$

$-18x=-10$

$x=5/9$

If $f(x)=50(0.92)^x+75$ then which of the following values of x solves the equation $f(x)=90$?

(1) 12.1 (3) 15.8

(2) 14.4 (4) 18.3

$90=50(.92)^x+75$

$15=50(.92)^x$

$.3=(.92)^x$

$\log_{.92}(.30)=x$ $x=14.439\ldots$

If \$500 is placed in a savings account that earns a 6% nominal interest compounded monthly, then which of the following represents the account's worth after 10 years?

(1) \$800.00 (3) \$895.42

(2) \$873.29 (4) \$909.70

$A=P(1+\frac{r}{n})^{nt}$

$A=500(1+\frac{.06}{12})^{12(10)}$

$A=909.70$

Given the function $f(x)=\log_2(2x-8)$, which of the following values of x is *not* in the domain of the function?

(1) $x=5$ (3) $x=8$

(2) $x=2$ (4) $x=20$

In a mortgage the monthly payment, *m*, is calculated using the formula: $m=\frac{P\left(\frac{r}{12}\right)\left(1+\frac{r}{12}\right)^n}{\left(1+\frac{r}{12}\right)^n-1}$,

where *P* is the principal of the loan, *n* is the number of payments and *r* is the monthly mortgage rate.

30 yrs → 360 months

$r=.05$

(a) If a loan had a principal amount of $P=\$250,000$ and a yearly rate of 5%, what monthly payment would be needed to pay off the loan in exactly 30 years? Show how you arrived at your answer.

$m=\frac{250000\left(\frac{.05}{12}\right)(1+\frac{.05}{12})^{360}}{(1+\frac{.05}{12})^{360}-1}$

$m=\$1342.05$

$P=$ $r=.06$

(b) If the principal was still \$250,000, but the yearly rate was 6%, determine algebraically the number of years it would take to pay off the loan with a monthly payment of \$2,000. Show your work. Round to the nearest tenth of a year.

$2000=\frac{250000\left(\frac{.06}{12}\right)(1+\frac{.06}{12})^n}{(1+\frac{.06}{12})^n-1}$

$n=196.656$ (months)

$n=16.4$ years