MDTP Precalculus Diagnostic Sample Test

Calculators are not allowed for the test.

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1. $a^{-2}\left(a^{-1}+a^{-4}\right)=$

(A) a^{-7} (B) $\dfrac{1}{a^3+a^6}$ (C) $\dfrac{1}{a^3}+\dfrac{1}{a^6}$ (D) $\dfrac{1}{a^3+a^6}$ (E) a^2+a^8

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2. $\dfrac{x}{\sqrt[3]{3}}=$

(A) $\dfrac{x\sqrt[3]{6}}{3}$ (B) $\dfrac{x\sqrt[3]{9}}{9}$ (C) $\dfrac{\sqrt[3]{3x}}{3}$ (D) $\dfrac{x\sqrt[3]{9}}{3}$ (E) $\dfrac{x\sqrt[3]{3}}{3}$

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3. If $f\left(x\right)=2x-7$ and $g\left(x\right)=2x^2-3,$ then $f\left(g\left(3\right)\right)=$

(A) 2 (B) 1 (C) 15 (D) -7 (E) 23

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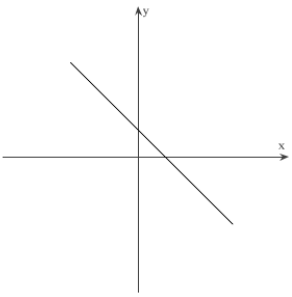
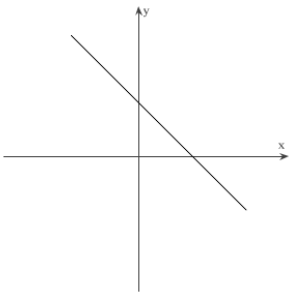
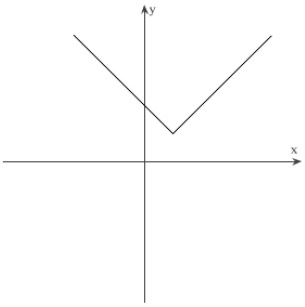
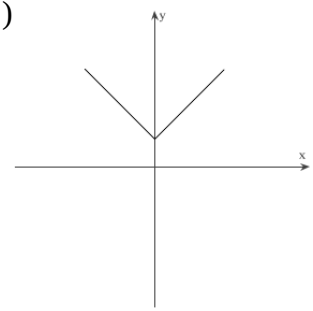
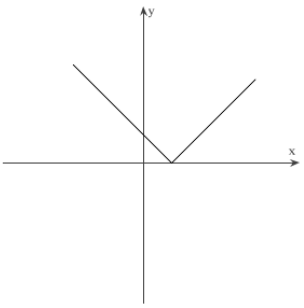
4. The graph of $y=f\left(x\right)$ is shown in the figure to the right.
Which of the following is the graph of $y=\left|f\left(x\right)\right|+1$?

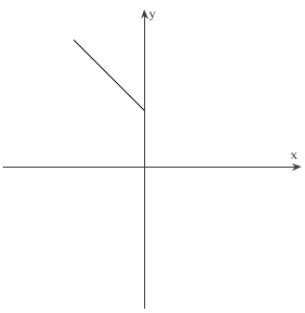


(A)


(B)


(C)


(D)


(E)


5. The inequality $|7-x|>8$ is equivalent to

(A) $-1<x<15$ (B) $x>15$ (C) $15<x$ or $-1>x$ (D) $-1<x$ or $15>x$ (E) $x<-1$

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6. If $\frac{2}{3}(x-1)+3=5x,$ then $x=$

(A) $\frac{9}{13}$ (B) $\frac{7}{3}$ (C) $\frac{1}{13}$ (D) $\frac{7}{13}$ (E) -12

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7. If $7=5^s$ then $s=$

(A) $\frac{7}{5}$ (B) 35 (C) $\sqrt[s]{\frac{7}{5}}$ (D) $\log_7 5$ (E) $\log_5 7$

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8. If $\log_4 x+\log_4(x-5)=\log_4 24,$ then $x=$

(A) 19 (B) 6 (C) 3 (D) 8 (E) -3

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9. One of the roots of $3x^2+11x-4$ is

(A) 4 (B) 1 (C) $\frac{1}{3}$ (D) -3 (E) $\frac{1}{\sqrt{3}}$

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10. The inequality $x^2<9$ is equivalent to

(A) $x<3$ (B) $x>-3$ (C) $x<3$ or $x>-3$ (D) $-3<x<3$ (E) $x<9$

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11. if $\sin x=-\frac{\sqrt{3}}{2}, \cos x=\frac{1}{2}$ and $0\le x\le 2\pi,$ then $x=$

(A) $\frac{2\pi}{3}$ (B) $\frac{7\pi}{3}$ (C) $\frac{5\pi}{6}$ (D) $\frac{5\pi}{3}$ (E) $-\frac{\pi}{6}$

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12. $\dfrac{\dfrac{14-7x}{x^2-x}}{\dfrac{x-2}{x-1}}=$

(A) $\frac{14x-7x^2}{x-1}$ (B) $\frac{14-7x}{x^2-x}$ (C) $-\frac{7}{x-1}$ (D) $\frac{2-x}{x}$ (E) $-\frac{7}{x}$

13. If $\frac{1}{3}$ is $\frac{5}{6}$ of $\frac{1}{2}$ of a certain number, then that number is

(A) -4 (B) $\frac{1}{6}$ (C) $\frac{5}{12}$ (D) $\frac{4}{5}$ (E) 12

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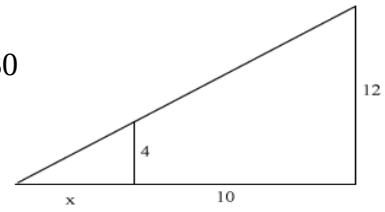
14. In the figure shown to the right, $x =$

(A) $\frac{12}{5}$ (B) 3 (C) $\frac{10}{3}$ (D) 5 (E) 30



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15. For how many different values of θ between 0 and 2π radians is $\sec x = \csc x$?

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

KEY- Precalculus Diagnostic Sample Test

Question	Correct Answer	Topic
1	C	EXPR
2	D	EXPR
3	E	FUNCT
4	B	FUNCT
5	C	LINR
6	D	LINR
7	E	LOGX
8	D	LOGX
9	C	POLY
10	D	POLY
11	D	TRIG
12	E	RATL
13	D	WORD
14	D	WORD
15	C	TRIG

EXPR	Exponents and Radicals
FUNCT	Functions
LINR	Linear Equations and Inequalities, and Absolute Values
LOGX	Logarithmic and Exponential Functions
POLY	Polynomials and Polynomial Functions
RATL	Rational Expressions and their Graphs
TRIG	Trigonometry
WORD	Word Problems