# Practice Test 1 (Test 1 Review)

Thursday, September 19, 2019 9:39 AM

**#1** $(3x+5)^2 = 5$

By the Square Root Property:

$\sqrt{(3x+5)^2} = \pm\sqrt{5}$

$3x+5 = \pm\sqrt{5}$

$3x = \pm\sqrt{5} - 5$ (Subtract 5 from both sides)

$3x = -5 \pm \sqrt{5}$ (Rewrite)

$x = \frac{-5 \pm \sqrt{5}}{3}$ (Divide by 3)

Solution set: $\left\{ \frac{-5+\sqrt{5}}{3} ; \frac{-5-\sqrt{5}}{3} \right\}$

Ans: B

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**#2**

$4x^2 = -6x - 1$

$4x^2 + 6x + 1 = 0$ (RHS = 0)

$a = 4$; $b = 6$; $c = 1$.

Quadratic Formula: $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-6 \pm \sqrt{(6)^2 - 4(4)(1)}}{2(4)} = \frac{-6 \pm \sqrt{36-16}}{8}$

$$x = \frac{-6 \pm \sqrt{20}}{8} = \frac{-6 \pm \sqrt{4}\cdot\sqrt{5}}{8}$$

$$x = \frac{-6 \pm 2\sqrt{5}}{8} = \frac{2(-3 \pm \sqrt{5})}{8\ 4}$$

$$x = \frac{-3 \pm \sqrt{5}}{4}$$

Solution set: $\left\{ \frac{-3+\sqrt{5}}{4} ; \frac{-3-\sqrt{5}}{4} \right\}$

Ans: D

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#3

$4x^2 + 52 = 0 \rightarrow 4x^2 = -52$

$\rightarrow x^2 = \frac{-52}{4} \rightarrow x^2 = -13$

$\rightarrow x = \pm\sqrt{-13} = \pm\sqrt{i^2 \cdot 13}$ (Recall: $i^2 = -1$)

$\rightarrow x = \pm i\sqrt{13}$

Solution set: $\{ i\sqrt{13}, -i\sqrt{13} \}$

Ans: C

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#4

$5x^3 + 3x^2 = 80x + 48$

$5x^3 + 3x^2 - 80x - 48 = 0$ (Make RHS = 0)

$x^2(5x+3) - 16(5x+3) = 0$ (Factor by grouping)

$(5x+3)(x^2-16)=0$ (Factor out the common factor $5x+3$)

$5x+3=0$ or $x^2-16=0$ (Set each factor $=0$)

$x^2=16$

$x=-\frac{3}{5}$ ; $x=\pm\sqrt{16}=\pm 4$

Solution set: $\left\{-\frac{3}{5}, -4, 4\right\}$

Ans: C

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#5

$\sqrt{8x+20}=x$

$\left(\sqrt{8x+20}\right)^2=x^2$ (Square both sides)

$8x+20=x^2$

$0=x^2-8x-20$

$0=(x-10)(x+2)$ (Factor)

$x-10=0$ or $x+2=0$

$x=10$ ; $x=-2$.

Check solutions:

For $x=10$: $\sqrt{8(10)+20}=10$

Is a solution $\sqrt{100}=10$ True.

Solution set: $\{10\}$

Ans: D

For $x=-2$: $\sqrt{8(-2)+20}=-2 \longrightarrow \underbrace{\sqrt{4}}_{2}=-2$ False.

Not a solution

**#6** $(\overbrace{3x-7}^{u})^2 - 4(\overbrace{3x-7}^{u}) - 12 = 0$

Let $u = 3x - 7$

Rewrite the equation in $u$:

$$u^2 - 4u - 12 = 0$$

$$(u + 2)(u - 6) = 0$$

$$u = -2 \; ; \quad u = 6$$

To solve for $x$ : plug in $u = 3x - 7$.

For $u = -2$: $-2 = 3x - 7 \rightarrow 5 = 3x \rightarrow x = \frac{5}{3}$

For $u = 6$ : $6 = 3x - 7 \rightarrow 13 = 3x \rightarrow x = \frac{13}{3}$

Solution set: $\left\{\frac{5}{3}, \frac{13}{3}\right\}$

Ans: A.

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**#7** $\{(-3,-8); (3,6); (5,-5); (7,-6); (10,6)\}$

This is a function because none of the first components is repeated.

Ans: B

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**#8** $f(x) = x^2 - 5x + 1$. Find $f(-3)$.

$$f(-3) = (-3)^2 - 5(-3) + 1$$

$$= 9 + 15 + 1 = 25$$

So, $f(-3) = 25$.

Ans: A.

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**#9** $f(x) = 3x^2 - 4x + 2$. Find $f(x-1)$

$$f(x-1) = 3(x-1)^2 - 4(x-1) + 2$$

$$= 3(x-1)(x-1) - 4x + 4 + 2$$

$$= 3(x^2 - x - x + 1) - 4x + 6$$

$$= 3(x^2 - 2x + 1) - 4x + 6$$

$$= 3x^2 - 6x + 3 - 4x + 6$$

$$= 3x^2 - 10x + 9 \quad \text{(combine like terms)}$$

So, $f(x-1) = 3x^2 - 10x + 9$.

Ans: D

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**#10**

Domain: left most to rightmost on x-axis: $[-3, 0]$

Range: lowest to highest on y-axis: $[-4, 0]$

Ans: B

#11

$$f(x) = \begin{cases} x-5 & \text{if } x > 3 \\ -(x-5) & \text{if } x \leq 3. \end{cases}$$

Find $f(3)$

$f(3)$ → equals to 3 → use second formula

$$f(3) = -(3-5) = -(-2) = 2$$

Ans: C.

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#12

Vertical line test: this is a function of y as a function of x.

Ans: A.

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#13

$$x^2 + 9x - 36 = 0$$

$$(x+12)(x-3) = 0 \quad \text{(Factor)}$$

$$x + 12 = 0 \quad \text{or} \quad x - 3 = 0$$

$$x = -12 \; ; \; x = 3$$

Solution set: $\{-12, 3\}$

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#14

$$x^4 - 11x^2 + 18 = 0$$

$$(\underbrace{x^2}_{u})^2 - 11\underbrace{x^2}_{u} + 18 = 0$$

Let $u = x^2$

Rewrite equation in $u$:

$$u^2 - 11u + 18 = 0$$

$$(u-2)(u-9) = 0$$

$$u = 2 \quad ; \quad u = 9.$$

Plug in $u = x^2$:

For $u = 2$: $x^2 = 2 \longrightarrow x = \pm\sqrt{2}$

For $u = 9$: $x^2 = 9 \longrightarrow x = \pm\sqrt{9} = \pm 3$

Solution set: $\boxed{\{\sqrt{2}, -\sqrt{2}, 3, -3\}}$

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**#15**

$g(x) = 4x - 4$. Find $g(x-1)$

$$g(x-1) = 4(x-1) - 4$$

$$= 4x - 4 - 4 = 4x - 8$$

So, $\boxed{g(x-1) = 4x - 8}$

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**#16**

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

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

$$= -x^3 + 5x = -(\underbrace{x^3 - 5x}_{f(x)})$$

Compare

So, $f(-x) = -f(x)$. So, $f$ is $\boxed{\text{ODD}}$

#17 $3x^4 - 300x^2 = 0$

$3x^2(x^2 - 100) = 0$ (Factor out $3x^2$)

$3x^2 = 0$ or $x^2 - 100 = 0$ (Set each factor $= 0$)

$x^2 = \frac{0}{3} = 0$ | $x^2 = 100$

$x = 0$ | $x = \pm\sqrt{100} = \pm 10$

Solution set: $\{0, -10, 10\}$

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#18 $\sqrt{20x - 20} = x + 4$

$(\sqrt{20x - 20})^2 = (x+4)^2$ (Square both sides)

$20x - 20 = (x+4)(x+4)$

$20x - 20 = x^2 + 4x + 4x + 16$

$20x - 20 = x^2 + 8x + 16$

$0 = x^2 + 8x + 16 - 20x + 20$

$0 = x^2 - 12x + 36$

$0 = (x-6)(x-6)$

So, $x - 6 = 0$. So, $x = 6$

Check solution: $\sqrt{20(6) - 20} = 6 + 4$

$\sqrt{100} = 10$. True.

So, Solution set: $\{6\}$