Practice Test 1

Thursday, February 6, 2020 9:38 AM

M.C. Section

1 $(5x-7)^2 = 12$

Take the Square Root of both sides:

$\cancel{\sqrt{(5x-7)^{2}}} = \pm\sqrt{12}$

$5x - 7 = \pm\sqrt{12}$

$5x = 7 \pm \sqrt{12}$ (Add 7 to both sides)

$x = \dfrac{7 \pm \sqrt{12}}{5}$

$x = \dfrac{7 \pm \sqrt{3\cdot 4}}{5} = \dfrac{7 \pm 2\sqrt{3}}{5}$

So, $\boxed{x = \dfrac{7 \pm 2\sqrt{3}}{5}}$ Choice A.

2 $2x^2 = -8x - 5 \longrightarrow 2x^2 + 8x + 5 = 0$

$a = 2$; $b = 8$; $c = 5$.

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{-8 \pm \sqrt{8^2 - 4\cdot 2\cdot 5}}{2\cdot 2}$

$x = \dfrac{-8 \pm \sqrt{24}}{4} = \dfrac{-8 \pm \sqrt{4\cdot 6}}{4} = \dfrac{-8 \pm 2\sqrt{6}}{4} = \boxed{\dfrac{-4 \pm \sqrt{6}}{2}}$

Choice D

$\boxed{3}$ $4x^2 = 52 \longrightarrow x^2 = \frac{52}{4} \rightarrow x^2 = 13$

$\rightarrow \boxed{x = \pm\sqrt{13}}$ Choice B

$\boxed{4}$ $2x^3 + 5x^2 = 8x + 20$

$\underbrace{2x^3 + 5x^2} \underbrace{- 8x - 20} = 0$

$x^2\boxed{(2x+5)} - 4\boxed{(2x+5)} = 0$

$(2x+5)(x^2-4) = 0$

$2x + 5 = 0 \quad ; \quad x^2 - 4 = 0$

$\boxed{x = -\frac{5}{2}} \quad ; \quad x^2 = 4 \rightarrow \boxed{x = \pm 2}$

Solution set : $\boxed{\left\{-\frac{5}{2}, -2, 2\right\}}$ Choice B

$\boxed{5}$ $\left(\cancel{\sqrt{}}\,3x+18\right)^{\cancel{2}} = (x)^2$

Square both sides:

$3x + 18 = x^2$

$\longrightarrow 0 = x^2 - 3x - 18$

$(x-6)(x+3) = 0$

$x - 6 = 0 \; ; \; x + 3 = 0$

$x = 6 \; ; \; x = -3$

Check Solution:

$x = 6$: $\sqrt{3 \cdot 6 + 18} \overset{?}{=} 6$

$\sqrt{36} \overset{?}{=} 6$

$6 = 6$ True.

$x = -3$: $\sqrt{3 \cdot (-3) + 18} \overset{?}{=} -3$

$\sqrt{9} \overset{?}{=} -3$

$3 = -3$. False

Solution set: $\{6\}$. Choice C

$\boxed{6}$ $\boxed{(x-5)}^2 + 4\boxed{(x-5)} - 5 = 0$

Let $u = x - 5$

Rewrite: $u^2 + 4u - 5 = 0$

$(u+5)(u-1) = 0$

$u + 5 = 0$; $u - 1 = 0$

$u = -5$; $u = 1$

Choice D

Solve for x: $x - 5 = -5$; $x - 5 = 1$

$\boxed{x = 0}$; $\boxed{x = 6}$

7 This is a function. (No repetition in Domain)
Choice B

8 $f(x) = x^2 + 2x - 5$

Find $f(-4)$

$$f(-4) = (-4)^2 + 2(-4) - 5$$
$$= 16 - 8 - 5$$
$$= 8 - 5$$
$$\boxed{f(-4) = 3}$$ Choice A

9 $f(x) = 2x^2 - 5x - 4$. Find $f(x-1)$

$$f(x-1) = 2(x-1)^2 - 5(x-1) - 4$$
$$= 2(x-1)(x-1) - 5x + 5 - 4$$
$$= 2(x^2 - 2x + 1) - 5x + 1$$
$$= 2x^2 \boxed{-4x} + 2 \boxed{-5x} + 1$$
$$\boxed{f(x-1) = 2x^2 - 9x + 3}$$ Choice A

$\boxed{10}$ Domain : on x-axis (left to right)

$D = [-3, 0]$

Range : on y-axis (bottom to top)

$R = [-2, 2]$ Choice D

$\boxed{11}$ $f(3) = 3(3) = \boxed{9}$ Choice C

equal to 3 → second formula

$\boxed{12}$ This is a function. (Passes Vertical line test)

Choice B

Short Answer.

$\boxed{13}$

$$2x^2 - 15x = 8$$

$$2x^2 - 15x - 8 = 0$$

$$(2x + 1)(x - 8) = 0$$

$$2x + 1 = 0 \quad ; \quad x - 8 = 0$$

$$x = -\frac{1}{2} \quad ; \quad x = 8$$

Solution set

$$\boxed{\left\{-\frac{1}{2}, 8\right\}}$$

14 $x^4 - 15\boxed{x^2} + 54 = 0$

Let $u = x^2$. $x^4 = (x^2)^2 = u^2$

Rewrite: $u^2 - 15u + 54 = 0$

$(u-9)(u-6) = 0$

$u - 9 = 0$; $u - 6 = 0$

$u = 9$; $u = 6$

Solve for x: $x^2 = 9$; $x^2 = 6$

$x = \pm 3$; $x = \pm\sqrt{6}$

Solution set: $\boxed{\{-3, 3, -\sqrt{6}, \sqrt{6}\}}$

15 $f(x) = x^2 - 3$; find $f(x-4)$

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

$= (x-4)(x-4) - 3$

$= x^2 - 4x - 4x + 16 - 3$

$\boxed{f(x-4) = x^2 - 8x + 13}$

$\boxed{16}$ $f(x) = \boxed{x^3 - x^2}$

$f(-x) = (-x)^3 - (-x)^2$

$= \boxed{-x^3 - x^2}$

Not the same
Not the opposite.

f is $\boxed{\text{Neither}}$ odd nor even

Essay section

$\boxed{17}$ $5x^4 - 500x^2 = 0$

$5x^2(x^2 - 100) = 0$

$5x^2 = 0$ or $x^2 - 100 = 0$

$x^2 = \frac{0}{5}$ | $x^2 = 100$

$x^2 = 0$ | $x = \pm 10$

$x = 0$

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

$\boxed{18}$ $\left(\cancel{\sqrt{x^2-5x+36}}\right)^{\cancel{2}} = (x+1)^2$ → Square both sides

$$x^2-5x+36 = (x+1)(x+1)$$

$$\cancel{x^2}-5x+36 = \cancel{x^2}+2x+1$$

$$-5x+36-2x-1=0$$

$$-7x+35=0$$

$$-7x=-35$$

$$x=\frac{-35}{-7} \rightarrow x=5$$

Check:

$$\sqrt{5^2-5\cdot 5+36} \stackrel{?}{=} 5+1$$

$$\sqrt{36} \stackrel{?}{=} 6$$

$$6 = 6 \quad \text{True.}$$

Solution set: $\{5\}$