Accuplacer – College-Level Mathematics

Mixed Practice Module #1

For each of the questions below, choose the best answer from the five choices given. Use scratch paper as needed.

1. $3x(2x-1)+2(2x-1)$ is equal to

Factor out Common Factor $(2x-1)$

e.) $(3x+2)(2x-1)$

a. $6x(2x-1)$
b. $(3x-2)(2x-1)$
c. $(3x-2)(2x+1)$
d. $(3x+2)(2x+1)$
e. $(3x+2)(2x-1)$

2. The graph of which of the following equations is a straight line perpendicular to the graph of $= -3x$?

Perpendicular lines have opposite reciprocal slopes. $(\perp)$

$y_1 = -3x$ m_1(slope) $= -3$ $y_1 = m_1 x_1$

$m_\perp = +\frac{1}{3}$ Perpendicular slope will be $+1/3$

a. $3x + y = -3$ → $y = -3x - 3$, $m = -3$ NO
b. $x + 3y = 6$ → $3y = -x + 6$, $y = -\frac{1}{3}x + 2$, $m = -1/3$ NO
c. $x - 3y = -3$ → $-3y = -x - 3$, $y = \frac{1}{3}x + 1$, $m = 1/3$ Yes!
d. $3x - y = 6$ → $-y = -3x - 6$, $y = 3x + 6$, $m = +3$ NO
e. $3x + 3y = -3$ → $3y = -3x - 3$, $y = -1x - 1$, $m = -1$ NO

3. If $y \neq z$ and $\frac{1}{x} - \frac{1}{y} = \frac{1}{z}$ then $x =$

$xyz\left(\frac{1}{x} - \frac{1}{y} = \frac{1}{z}\right)$: multiply by common denominator xyz

a. $\frac{1}{z} + \frac{1}{y}$
b. $y + z$
c. $\frac{yz}{y+z}$
d. $\frac{y+z}{yz}$
e. $\frac{1}{yz}$

$yz - xz = xy$: isolate x ($+xz$)

$yz = xy + xz$: common factor (x)

$\frac{yz}{(y+z)} = \frac{x(y+z)}{(y+z)}$: isolate x

c.) $\frac{yz}{y+z} = x$

4. A root of $x^2 - 3x - 3 = 0$ is

a. $\frac{-3+\sqrt{21}}{2}$
b. $\frac{-3+\sqrt{15}}{2}$
c. $\frac{-3-\sqrt{21}}{2}$
d. $\frac{3-\sqrt{15}}{2}$
e. $\frac{3-\sqrt{21}}{2}$

option A
Quad. Formula
$ax^2+bx+c=0$
$a=1\ b=-3\ c=-3$
$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
$x = \frac{-(-3) \pm \sqrt{(-3)^2-4(1)(-3)}}{2(1)}$
$x = \frac{3 \pm \sqrt{9+12}}{2} = \frac{3 \pm \sqrt{21}}{2}$
e.) $\frac{3-\sqrt{21}}{2}$

5. If $8x^2 - 4x - 1 = 0$, then $\left(x - \frac{1}{4}\right)^2 =$?

Indicates that we need to complete the square!

a. $-\frac{3}{16}$
b. $-\frac{1}{8}$
c. 0
d. $+\frac{1}{8}$
e. $+\frac{3}{16}$

$8x^2-4x-1=0$
$+1\ \ +1$
$\frac{8x^2-4x}{8} = \frac{1}{8}$: make "a" value = 1

$x^2 - \frac{1}{2}x + \square = \frac{1}{8} + \square$
$\square = \left(\frac{b}{2}\right)^2 = \left(\frac{-1/2}{2}\right)^2$
$\square = \left(\frac{1}{4}\right)^2$
$\square = 1/16$
$x^2 - \frac{1}{2}x + 1/16 = 1/8 + 1/16$
FACTOR!
$\left(x - \frac{1}{4}\right)^2 = 3/16$

option B
complete the square!
$x^2 - 3x - 3 = 0$
$1x^2 - 3x + \square = 3 + \square$ $a=1$ ✓
$x^2 - 3x + \frac{9}{4} = 3 + \frac{9}{4}$
$\square = \left(\frac{b}{2}\right)^2 = \left(\frac{-3}{2}\right)^2 = \frac{9}{4}$
Factor!
$\left(x - \frac{3}{2}\right)^2 = \frac{21}{4}$
solve For x
square root
$x - \frac{3}{2} = \pm\sqrt{\frac{21}{4}}$
$x = \frac{3}{2} \pm \frac{\sqrt{21}}{\sqrt{4}}$
$x = \frac{3 \pm \sqrt{21}}{2}$
e.) $\frac{3-\sqrt{21}}{2}$