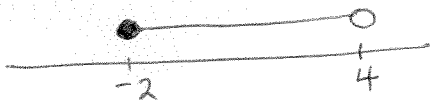


SPRING 2017 EXAM 1 SOLUTIONS

①

Graph



Interval Notation $[-2, 4)$

②

$$\begin{aligned} \frac{|7-|4-6|| + (5-2)^2}{\sqrt{4^2-12}} &= \frac{|7-|-2|| + 3^2}{\sqrt{16-12}} \\ &= \frac{|7-2| + 9}{\sqrt{4}} \\ &= \frac{5+9}{2} \\ &= \frac{14}{2} \\ &= 7 \end{aligned}$$

③

$$\begin{aligned} 6 - 2[(3x+2y) - 4(x-y)] + 11 \\ 6 - 2[3x+2y-4x+4y] + 11 \\ 6 - 2[-x+6y] + 11 \\ 6 + 2x - 12y + 11 \\ 17 + 2x - 12y \end{aligned}$$

④

$$\begin{aligned} (x^3y^2)^{-2} (3x^2y^{-2})^3 \\ (x^3)^{-2} \cdot (y^2)^{-2} \cdot (3)^3 (x^2)^3 (y^{-2})^3 \\ x^{-6} \cdot y^{-4} \cdot 27 x^6 y^{-6} \\ 27 x^0 y^{-10} \\ \frac{27}{y^{10}} \end{aligned}$$

$$\begin{aligned}
 (5) \quad & \left(\frac{1}{2} - \frac{1}{3} + \frac{1}{6} \right) \\
 & = \left(\frac{3 - 2 + 1}{6} \right)^{-2} \\
 & = \left(\frac{1}{3} \right)^{-2} \\
 & = \left(\frac{3}{1} \right)^2 \\
 & = 9
 \end{aligned}$$

$$(6) \quad \text{a) } 0.00026 = 2.6 \times 10^{-4}$$

$$\text{b) } 520,000,600 = 5.2 \times 10^8$$

$$\begin{aligned}
 (7) \quad & \sqrt[3]{x^2 y} \cdot \sqrt[3]{x^4 y^5} = (x^2 y)^{\frac{1}{3}} (x^4 y^5)^{\frac{1}{3}} \\
 & = (x^2 y \cdot x^4 y^5)^{\frac{1}{3}} \\
 & = (x^6 y^6)^{\frac{1}{3}} \\
 & = x^2 y^2
 \end{aligned}$$

$$\begin{aligned}
 (8) \quad & 3w^2 - 4w^3 + w - 2 \text{ in descending order of exponents is} \\
 & -4w^3 + 3w^2 + w - 2
 \end{aligned}$$

$$\text{a) Leading Term} = -4w^3$$

$$\text{b) Degree} = 3$$

$$\begin{aligned}
 (9) \quad & (3x - 2y)^2 = (3x - 2y)(3x - 2y) \\
 & = 9x^2 - 6xy - 6xy + 4y^2 \\
 & = 9x^2 - 12xy + 4y^2
 \end{aligned}$$

⑩ a) $6ab + 9b + 14a + 21$ (factor by grouping)
 $3b(2a + 3) + 7(2a + 3)$
 $(2a + 3)(3b + 7)$

b) $x^2 + 8x + 16$
 $x^2 + 4x + 4x + 16$
 $x(x + 4) + 4(x + 4)$
 $(x + 4)(x + 4)$
 $(x + 4)^2$

⑪ a) $\frac{x^2 - 4}{x^2 - 5x - 14}$ \rightarrow $\frac{x^2 - 4}{(x - 2)(x + 2)}$ \rightarrow $\frac{x^2 - 5x - 14}{x^2 - 7x + 2x - 14}$
 $\frac{x^2 - 5x - 14}{x^2 - 7x + 2x - 14}$
 $x(x - 7) + 2(x - 7)$
 $(x - 7)(x + 2)$
 $= \frac{(x - 2)(x + 2)}{(x - 7)(x + 2)}$
 $= \frac{x - 2}{x - 7}$

b) Restrictions on variable x
 $(x - 7) \neq 0$; $(x + 2) \neq 0$
 $\Rightarrow x \neq 7$ and $x \neq -2$

⑫ Rationalize $\sqrt{\frac{4}{9y}}$ (Multiply numerator and denominator by $\sqrt{9y}$)
 $\frac{\sqrt{4} \cdot \sqrt{9y}}{\sqrt{9y} \cdot \sqrt{9y}} = \frac{\sqrt{36} \cdot \sqrt{y}}{9y} = \frac{6\sqrt{y}}{9y}$
 $= \frac{2\sqrt{y}}{3y}$

13

Let the width be x ft
Then the length is $(x+3)$ ft

$$\text{Perimeter} = 2(l+w)$$

$$\Rightarrow 34 = 2(x+x+3)$$

$$17 = 2x+3$$

$$14 = 2x$$

$$\Rightarrow x = 7$$

Hence the width is 7ft and length is 10 ft.

14

$$8 = 3x + kx$$

$$8 = x(3+k)$$

$$x = \frac{8}{3+k}$$

15

$$\frac{x+3}{4} - \frac{x+2}{5} = \frac{x+1}{10}$$

Multiply by LCD = 20

$$20\left(\frac{x+3}{4}\right) - 20\left(\frac{x+2}{5}\right) = 20\left(\frac{x+1}{10}\right)$$

$$5(x+3) - 4(x+2) = 2(x+1)$$

$$5x+15 - 4x-8 = 2x+2$$

$$x+7 = 2x+2$$

$$5 = x$$

$$\Rightarrow x = 5$$

$$\begin{aligned} \textcircled{16} \quad \frac{\frac{1}{4x} + \frac{1}{2}}{1 + \frac{1}{2x}} &= \frac{\frac{1+2x}{4x}}{\frac{2x+1}{2x}} = \frac{1+2x}{4x} \cdot \frac{2x}{2x+1} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{17} \quad 2(3-7w) + 3 &= 2w + 9 - 16w \\ 6 - 14w + 3 &= -14w + 9 \\ -14w + 9 &= -14w + 9 \end{aligned}$$

LHS = RHS for all values of w , hence an Identity