SOLUTIONS => CHAPTER 5 & 6 REVIEW

MULTIPLE CHOICE

1. $7\sqrt{7} - 6\sqrt{12} - (4\sqrt{28} + 4\sqrt{3})$
$= 7\sqrt{7} - 6\sqrt{(2)(2)(3)} - 4\sqrt{(2)(2)(7)} - 4\sqrt{3}$
$= 7\sqrt{7} - 6(2)\sqrt{3} - 4(2)\sqrt{7} - 4\sqrt{3}$
$= 7\sqrt{7} - 12\sqrt{3} - 8\sqrt{7} - 4\sqrt{3}$
$= -1\sqrt{7} - 16\sqrt{3}$ C

2. $\sqrt[5]{64n^{10}m^{15}}$
$= \sqrt[5]{(2)(2)(2)(2)(2)(2)(n^5)(n^5)(m^5)(m^5)(m^5)}$
$= 2(n)(n)(m)(m)(m)\sqrt[5]{2}$
$= 2n^2m^3\sqrt[5]{2}$ D

3. $3\sqrt{175} + 6\sqrt{63}$
$= 3\sqrt{(5)(5)(7)} + 6\sqrt{(3)(3)(7)}$
$= 3(5)\sqrt{7} + 6(3)\sqrt{7}$
$= 15\sqrt{7} + 18\sqrt{7}$
$= 33\sqrt{7}$ B

4. $6\sqrt{80} - 2\sqrt{20}$
$= 6\sqrt{(2)(2)(2)(2)(5)} - 2\sqrt{(2)(2)(5)}$
$= 6(2)(2)\sqrt{5} - 2(2)\sqrt{5}$
$= 24\sqrt{5} - 4\sqrt{5}$
$= 20\sqrt{5}$ D

5. $-7\sqrt{6}(-6\sqrt{5} - 2\sqrt{6})$
$= 42\sqrt{30} + 14(6)$
$= 42\sqrt{30} + 84$ C

6. $(\sqrt{19}-\sqrt{7})(\sqrt{19}+\sqrt{7})$

$= 19+\sqrt{133}-\sqrt{133}-7$

$= 19-7$

$= 12$

C

7. $\sqrt{7x}=5$

$(\sqrt{7x})^2=(5)^2$

$\frac{7x}{7}=\frac{25}{7}$

$x=\frac{25}{7}$

B

8. $\sqrt{4x}-5=6$

$\sqrt{4x}=6+5$

$\sqrt{4x}=11$

$(\sqrt{4x})^2=(11)^2$

$\frac{4x}{4}=\frac{121}{4}$

$x=\frac{121}{4}$

C

9. $\sqrt{x+3}=\sqrt{2x+8}$

$(\sqrt{x+3})^2=(\sqrt{2x+8})^2$

$x+3=2x+8$

$3-8=2x-x$

$-5=x$

B

10. $-4-\sqrt{4-x}=6$

Restriction: $4-x \geq 0$

$-x \geq -4$

$\frac{-x}{-1} \geq \frac{-4}{-1}$

$x \leq 4$

C

11. $\frac{12}{x^2-4}$

$= \frac{12}{(x-2)(x+2)}$

N.P. Values

$x-2 \neq 0 \quad x+2 \neq 0$

$x \neq 2 \quad x \neq -2$

A

12. $\frac{-3x+12}{32-8x}$

$= \frac{-3x+12}{-8x+32}$

$= \frac{-3(x-4)}{-8(x-4)}$

$= \frac{-3}{-8}$

$= \frac{3}{8}$

C

13. $\frac{6x^9}{3x^3} \times \frac{x^8}{9x^6}$

$= \frac{6x^{17}}{27x^9}$

$= \frac{2}{9}x^8$

A

14. $\frac{12x^{12}}{4x^3} \div \frac{x^8}{24x^6}$

$= 3x^9 \times \frac{24x^6}{x^8}$

$= \frac{72x^{15}}{x^8}$

$= 72x^7$ D

15. $\frac{x^2+6x}{2x^2+15x+27} \times \frac{x+3}{x^2-36}$

$= \frac{x(x+6)}{(2x+9)(x+3)} \times \frac{x+3}{(x-6)(x+6)}$

$= \frac{x}{(2x+9)(x-6)}$ B

* $2x^2+15x+27$

$(x+\frac{9}{2})(x+\frac{6}{2})$

$(2x+9)(x+3)$

16. $\frac{13}{x+5} - \frac{12}{x+5}$

$= \frac{1}{x+5}$ D

17. $\frac{x+8}{x^2+9x+20} + \frac{x+5}{x^2+7x+12}$

$= \frac{x+8}{(x+4)(x+5)} + \frac{x+5}{(x+3)(x+4)}$

$= \frac{(x+8)(x+3)}{(x+3)(x+4)(x+5)} + \frac{(x+5)(x+5)}{(x+3)(x+4)(x+5)}$

$= \frac{x^2+3x+8x+24+x^2+5x+5x+25}{(x+3)(x+4)(x+5)}$

$= \frac{2x^2+21x+49}{(x+3)(x+4)(x+5)}$ D

18. $\frac{x}{x+1} = \frac{4-x}{x^2-3x-4} + \frac{6}{x-4}$

$\frac{x}{x+1} = \frac{4-x}{(x+1)(x-4)} + \frac{6}{x-4}$

* N.P. Values $x \neq -1, 4$

$(x+1)(x-4)\left[\frac{x}{x+1}\right] = (x+1)(x-4)\left[\frac{4-x}{(x+1)(x-4)}\right] + (x+1)(x-4)\left[\frac{6}{x-4}\right]$

$x(x-4) = 4-x+6(x+1)$

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

$x^2-4x = 10+5x$

$x^2-4x-5x-10=0$

$x^2-9x-10=0$

$(x+1)(x-10)=0$

$x+1=0 \quad x-10=0$

$x=-1 \quad x=10$

Extraneous

A

19. $\frac{9x+2}{x-9} = \frac{2}{5}$

$5(x-9)\left[\frac{9x+2}{x-9}\right] = 5(x-9)\left[\frac{2}{5}\right]$

$5(9x+2) = 2(x-9)$

$45x + 10 = 2x - 18$

$45x - 2x = -18 - 10$

$\frac{43x}{43} = \frac{-28}{43}$

$x = \frac{-28}{43}$ A

MATCHING

1. $4\sqrt{3} - 9\sqrt{192}$

$= 4\sqrt{3} - 9\sqrt{(2)(2)(2)(2)(2)(2)(3)}$

$= 4\sqrt{3} - 9(2)(2)(2)\sqrt{3}$

$= 4\sqrt{3} - 72\sqrt{3}$

$= -68\sqrt{3}$ C

2. $4x(\sqrt[3]{24x^{11}})$

$= 4x(\sqrt[3]{(2)(2)(2)(3)(x^3)(x^3)(x^3)(x^2)})$

$= 4x(2)(x)(x)(x)\sqrt[3]{3x^2}$

$= 8x^4\sqrt[3]{3x^2}$ E

3. $\frac{4\sqrt{3}}{\sqrt{8}-9}\cdot\frac{(\sqrt{8}+9)}{(\sqrt{8}+9)}$

$= \frac{4\sqrt{24}+36\sqrt{3}}{(\sqrt{8})^2-(9)^2}$

$= \frac{4\sqrt{24}+36\sqrt{3}}{8-81}$

$= \frac{4\sqrt{24}+36\sqrt{3}}{-73}$ B

4. $(4\sqrt{3})(8\sqrt{9})$

$= 32\sqrt{27}$

$= 32\sqrt{(3)(3)(3)}$

$= 32(3)\sqrt{3}$

$= 96\sqrt{3}$ A

SHORT ANSWER

1a) $\frac{2\sqrt{3}+4}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)$

$= \frac{2(3)+4\sqrt{3}}{3}$

$= \frac{6+4\sqrt{3}}{3}$

b) $\frac{5\sqrt{3}+\sqrt{2}}{2\sqrt{3}-\sqrt{2}}\left(\frac{2\sqrt{3}+\sqrt{2}}{2\sqrt{3}+\sqrt{2}}\right)$

$= \frac{10(3)+5\sqrt{6}+2\sqrt{6}+2}{(2\sqrt{3})^2-(\sqrt{2})^2}$

$= \frac{30+7\sqrt{6}+2}{4(3)-2}$

$= \frac{32+7\sqrt{6}}{12-2}$

$= \frac{32+7\sqrt{6}}{10}$

2. $4-\sqrt{4+x^2}=x$

$4-x=\sqrt{4+x^2}$

$(4-x)^2=(\sqrt{4+x^2})^2$

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

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

$16-8x+x^2=4+x^2$

$16-4-8x+x^2-x^2=0$

$12-8x=0$

$\frac{12}{8}=\frac{8x}{8}$

$\frac{12}{8}=x$

$\frac{3}{2}=x$

* No N.P. Values since $4+x^2$ will always be positive.

3. $\frac{5}{x-1} + \frac{2}{x+1} = -6$

N.P. Values: $x \neq 1, -1$

$(x-1)(x+1)\left[\frac{5}{x-1}\right] + (x-1)(x+1)\left[\frac{2}{x+1}\right] = (x-1)(x+1)(-6)$

$5(x+1) + 2(x-1) = -6(x-1)(x+1)$

$5x+5+2x-2 = -6(x^2+1x-1x-1)$

$7x+3 = -6(x^2-1)$

$7x+3 = -6x^2+6$

$6x^2+7x+3-6=0$

$6x^2+7x-3=0$

$9 \times -2 = -18$

$9 + -2 = 7$

$(x+\frac{9}{6})(x-\frac{2}{6})=0$

$(x+\frac{3}{2})(x-\frac{1}{3})=0$

$(2x+3)(3x-1)=0$

$2x+3=0 \qquad 3x-1=0$

$2x=-3 \qquad 3x=1$

$x=-3/2$ ✓ $\qquad x=1/3$ ✓

PROBLEM

1a) $A = \frac{x+4}{x^2+9x+20}$

$A = \frac{x+4}{(x+4)(x+5)}$

$A = \frac{1}{x+5}$

$x \neq -4, -5$

$B = \frac{3x^2-9x}{x^2+3x-18}$

$B = \frac{3x(x-3)}{(x+6)(x-3)}$

$B = \frac{3x}{x+6}$

$x \neq -6, 3$

b)

i) $A - B$

$= \frac{1}{x+5} - \frac{3x}{x+6}$

$= \frac{1(x+6)}{(x+5)(x+6)} - \frac{3x(x+5)}{(x+5)(x+6)}$

$= \frac{x+6-3x^2-15x}{(x+5)(x+6)}$

$= \frac{-3x^2-14x+6}{(x+5)(x+6)}$

ii) AB

$= \left(\frac{1}{x+5}\right)\left(\frac{3x}{x+6}\right)$

$= \frac{3x}{(x+5)(x+6)}$

iii) $B \div A$

$= \left(\frac{3x}{x+6}\right) \div \left(\frac{1}{x+5}\right)$

$= \frac{3x}{x+6} \times \frac{x+5}{1}$

$= \frac{3x(x+5)}{x+6}$