JAMES RUSE – YEAR 9 – ALGEBRA TEST

NAME: _____

Question 1: Simplify:

(a) $5ab-7+3ba-9=$

(b) $-8p^2\times 4p^3q=$

(c) $\dfrac{21m^4n^2}{14mn^3}=$

Question 2: Write as a single fraction:

(a) $\dfrac{3x}{10}+\dfrac{2x}{15}=$

(b) $\dfrac{2m}{3p}-\dfrac{m}{2p}=$

(c) $\dfrac{xy}{a}\div\dfrac{x^3}{a^2y}=$

Question 3: Expand and simplify:

(a) $-7(a-3)+15=$

(b) $15-(2m-7)=$

(c) $6(x+7)-5(3x-2)=$

(d) $(a+7)(b-3)=$

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

Question 3 (continued)

(f) $(t+11)(t-11)=$

(g) $(3m-1)(7m+5)=$

(h) $(2x-3y)(2x+3y)=$

Question 4: Factorise:

(a) $x^2-7x+12=$

(b) $m^2-16=$

(c) $3t^2+18t+15=$

(d) $4q^2-7q-2=$

(e) $6+7c-3c^2=$

(f) $u^4-16v^4=$

(g) $k^3-27=$

(h) $6d^3+48=$

Question 5: Factorise and simplify:

(a) $\frac{x^2-16}{2x^3+8x^2}=$

(b) $\frac{m^2+5m-6}{m^2+7m+6}=$

(c) $\frac{n^2-9}{n^2-6n+5}\times\frac{n^2-25}{n^2-11n+24}=$

(d) $\frac{8t}{4t^2-36}\div\frac{t^2+5t}{t^2+8t+15}=$

Question 6: Simplify:

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

(b) $\frac{4}{a^2bc}-\frac{3}{abc^2}=$

(c) $\frac{4}{x-1}+\frac{3}{x+2}=$

(d) $\frac{7}{y+3}\div\frac{5}{(y+3)^2}=$

(e) $\frac{4}{p^2-p-2}+\frac{3}{p^2+3p+2}=$

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YEAR 9 – ALGEBRA TEST

NAME: SOLUTIONS

Question 1: Simplify:

(a) $5ab-7+3ba-9=$ $8ab-16$ $=8(ab-2)$ ✓

(b) $-8p^2\times 4p^3q=$ $=-32p^5q$ ✓

(c) $\dfrac{21m^3n^2}{14mn^3}=$ $\dfrac{21m^3}{14mn}$ $=\dfrac{3m^3}{2n}$ ✓ 3

Question 2: Write as a single fraction:

(a) $\dfrac{3x}{10}+\dfrac{2x}{15}=$ $\dfrac{9x}{30}+\dfrac{4x}{30}$ $=\dfrac{13x}{30}$ ✓ 3

(b) $\dfrac{2m}{3p}-\dfrac{m}{2p}=$ $\dfrac{4m}{6p}-\dfrac{3m}{6p}=\dfrac{m}{6p}$ ✓

(c) $\dfrac{xy}{a}\div\dfrac{x^3}{a^2y}=$ $\dfrac{xy}{a}\times\dfrac{a^2y}{x^3}$ $=\dfrac{y^2a}{x^2}$ ✓

Question 3: Expand and simplify:

(a) $-7(a-3)+15=$ $-7a+21+15$ $=36-7a$ ✓

(b) $15-(2m-7)=$ $15-2m+7$ $=22-2m$ ✓

(c) $6(x+7)-5(3x-2)=$ $6x+42-15x+10$ $=52-9x$ ✓

(d) $(a+7)(b-3)=$ $ab+7b-3a-21$ ✓

(e) $(x+4)^2=$ $(x+4)(x+4)$ $=x^2+8x+16$ ✓

Question 3 (continued)

(f) $(t+11)(t-11)=$ t^2-121 ✓

(g) $(3m-1)(7m+5)=$ $21m^2-7m+15m-5$ $=21m^2+8m-5$ ✓

(h) $(2x-3y)(2x+3y)=$ $(2x)^2-(3y)^2$ $=4x^2-9y^2$ ✓ 12

Question 4: Factorise:

(a) $x^2-7x+12=$ $(x-4)(x-3)$ ✓

(b) $m^2-16=$ m^2-4^2 $=(m+4)(m-4)$ ✓

(c) $3t^2+18t+15=$ $(3t+15)(t+1)$ −1

(d) $4q^2-7q-2=$ $(4q+1)(q-2)$ ✓

(e) $6+7c-3c^2=$ $-(3c^2-7c-6)$ $-(3c+2)(c-3)$ ✓

(f) $u^4-16v^4=$ $(u^2)^2-(4v^2)^2$ $=(u^2-4v^2)(u^2+4v^2)$ −1

(g) $k^3-27=$ k^3-3^3 $(k-3)(k^2+3k+9)$ ✓

(h) $6d^3+48=$ $6(d^3+8)$ $=6(d^3+2^3)$ ✗ −1

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Question 5: Factorise and simplify:

(a) $\frac{x^2-16}{2x^3+8x^2} = \frac{(x-4)(x+4)}{2x^2(x+4)}$

$= \frac{x-4}{2x^2}$ ✓

(b) $\frac{m^2+5m-6}{m^2+7m+6} = \frac{(m+6)(m-1)}{(m+6)(m+1)}$

$= \frac{m-1}{m+1}$ ✓

(c) $\frac{n^2-9}{n^2-6n+5} \times \frac{n^2-25}{n^2-11n+24} =$

$\frac{(n-3)(n+3)(n-5)(n+5)}{(n-5)(n-1)(n-8)(n-3)}$

$= \frac{(n+3)(n+5)}{(n-1)(n-8)}$ ✓

(d) $\frac{8t}{4t^2-36} \div \frac{t^2+5t}{t^2+8t+15} =$

$\frac{8t}{4(t-3)(t+3)} \times \frac{(t+5)(t+3)}{t(t+5)}$

$= \frac{2}{t-3}$ ✓ 10

Question 6: Simplify:

(a) $\frac{3}{x}+\frac{5}{y} = \frac{3y+5x}{xy}$ ✓

(b) $\frac{4}{a^2bc}-\frac{3}{abc^2} = \frac{4c-3a}{a^2bc^2}$ ✓

(c) $\frac{4}{x-1}+\frac{3}{x+2} = \frac{4x+8+3x-3}{(x-1)(x+2)}$

$= \frac{7x+5}{(x-1)(x+2)}$ ✓

(d) $\frac{7}{y+3}-\frac{5}{(y+3)^2} = \frac{7y+21-5}{(y+3)^2}$

$= \frac{7y+16}{(y+3)^2}$ ✓

(e) $\frac{4}{p^2-p-2}+\frac{3}{p^2+3p+2} =$

$\frac{4}{(p-2)(p+1)} + \frac{3}{(p+2)(p+1)}$

$\frac{4(p+2)+3(p-2)}{(p-2)(p+2)(p+1)}$

$= \frac{4p+8+3p-6}{(p-2)(p+2)(p+1)}$

$= \frac{7p+2}{(p-2)(p+2)(p+1)}$ ✓ 2

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