

Show all necessary steps clearly, neatly, systematically to receive full credit.

1. Perform indicated operation.

a.  $(5x^2y^2 + 6x + 9y) + (-x - y + x^2y^2)$

e.  $(5x - 2)^2$

b.  $(3m^3 + 7m^2 - 20) - (-8m + 8m^3 - 14)$

f.  $(ab - 0.6)(0.8ab + 0.4)$

c.  $12x^2(-10x^6 + 3x^2 - 9)$

g.  $(9x - 7y)(9x + 7y)$

d.  $(x - 1)(4x - 7)$

h.  $(6x - 1)(x^2 - 4x + 1)$

i.  $\frac{8x^2 + 24x - 13}{4x}$

l.  $(x^4 + 4x - 7 - 3x^2) \div (x^2 - 4)$

j. Use synthetic division  $(6x^2 + 37x - 18) \div (x - 7)$

k.  $[y - (x - 2)][y + (x - 2)]$

2. Factor the polynomial completely. If the polynomial cannot be factored, say it is prime.

a.  $xy + 11x - 2y - 22$

d.  $9x^2 + 13x - 10$

b.  $x^4 - 1$

e.  $25x^2 + 49$

c.  $x^2 - 11x + 30$

f.  $15(x + 11) - y(x + 11)$

g.  $3x^2y - 9xy - 120y$

l.  $3t^5 - 6t^4 - 45t^3$

h.  $28x^3 - 132x^2 + 80x$

m.  $12x^2 + 15x - 20x - 25$

i.  $20x^2 + 27x + 9$

n.  $x^2 + 2xy - 15y^2$

j.  $x^2 - 5x - 24$

o.  $81x^2 + 90xy + 25y^2$

k.  $25x^3 - 81x$

p.  $125x^3 + y^3$

q.  $4x^4y - 64y^5$

r.  $x^3 - 4x^2 - 9x + 36$

s.  $18x^3y + 57x^2y^2 + 30xy^3$

3. Solve:

a.  $9x^2 = 16x$

b.  $9x^2 = 16$

c.  $x(3x + 8) = -5$

d.  $(x + 8)(x - 3) = -30$

e.  $(y + 1)^2 - 8(y + 1) - 9 = 0$

4. Simplify:  $\frac{xy+4y-7x-28}{x^2+11x+28}$ .

7. Divide:  $\frac{x^2-25}{2x-2} \div \frac{x^2+10x+25}{x^2+4x-5}$ .

5. Multiply:  $\frac{25-y^2}{y^2-2y-35} \cdot \frac{y^2-8y-20}{y^2-3y-10}$ .

8. Simplify:  $\frac{\frac{2x}{x+1} - \frac{x^2-3}{x^2+3x+2}}{4 + \frac{4}{x+2}}$ .

6. Perform indicated operation:  $\frac{2x}{x^2-16} - \frac{1}{4-x}$ .

9. Consider the polynomial function  $f(x) = 2x^2 - 5x + 4$ , **(i)** find  $f(-3)$ , **(ii)** find  $f(x+h)$  and simplify your final answer.
10. Let  $f(x) = x^4 - 65x^2 + 55$ . Use the Factor Theorem to determine whether  $x - 8$  is a factor of the function.
11. The base of a triangle is 4 m shorter than its height. What are the height and base of the triangle if its area is 48 square meters?