01a. Factor $12x^2 - 16x - 3$.

$12x^2 - 18x + 2x - 3$	2 pts to here
$6x(2x - 3) + (2x - 3)$	3 pts to here
$(2x - 3)(6x + 1)$	4 pts to here

01b. Factor $9x^2 - 6x - 8$.

$9x^2 - 12x + 6x - 8$	2 pts to here
$3x(3x - 4) + 2(3x - 4)$	3 pts to here
$(3x + 2)(3x - 4)$	4 pts to here

01c. Factor $4x^2 - 8x - 5$.

$4x^2 - 10x + 2x - 5$	2 pts to here
$2x(2x - 5) + (2x - 5)$	3 pts to here
$(2x - 5)(2x + 1)$	4 pts to here

01d. Factor $3x^2 - 2x - 8$.

$3x^2 - 6x + 4x - 8$	2 pts to here
$3x(x - 2) + 4(x - 2)$	3 pts to here
$(3x + 4)(x - 2)$	4 pts to here

01.5a. Factor $w^2 - 8w + 7$.

$w^2 - 7w - w + 7$	2 pts to here
$w(w - 7) - (w - 7)$	3 pts to here
$(w - 7)(w - 1)$	4 pts to here

01.5b. Factor $w^2 - 5w + 6$.

$w^2 - 2w - 3w + 6$	2 pts to here
$w(w - 2) - 3(w - 2)$	3 pts to here
$(w - 2)(w - 3)$	4 pts to here

01.5c. Factor $w^2 - 7x + 10$.

$w^2 - 2w - 5w + 10$	2 pts to here
$w(w - 2) - 5(w - 2)$	3 pts to here
$(w - 2)(w - 5)$	4 pts to here

01.5d. Factor $w^2 - 7x + 12$.

$w^2 - 3w - 4w + 12$	2 pts to here
$w(w - 3) - 4(w - 3)$	3 pts to here
$(w - 3)(w - 4)$	4 pts to here

02a. Factor $5ax + 10bx - ay - 2by$.

$5x(a+2b) - y(a+2b)$	2 pts to here
$(a+2b)(5x-y)$	4 pts to here

02b. Factor $6ax + 48bx - ay - 8by$.

$6x(a+8b) - y(a+8b)$	2 pts to here
$(a+8b)(6x-y)$	4 pts to here

02c. Factor $2ax - a - 2bx + b$.

$a(2x-1) - b(2x-1)$	2 pts to here
$(a-b)(2x-1)$	4 pts to here

02d. Factor $5nz - n - 5mz + m$.

$n(5z-1) - m(5z-1)$	2 pts to here
$(n-m)(5z-1)$	4 pts to here

02.5a. Factor $ax^2 + bx^2 - 25a - 25b$.

$x^2(a+b) - 25(a+b)$	2 pts to here
$(x^2-25)(a+b)$	3 pts to here
$(x-5)(x+5)(a-b)$	4 pts to here

02.5b. Factor $cx^2 + dx^2 - 4c - 4d$.

$x^2(c+d) - 4(c+d)$	2 pts to here
$(x^2-4)(c+d)$	3 pts to here
$(x-2)(x+2)(c+d)$	4 pts to here

02.5c. Factor $ax^2 - bx^2 - 9a + 9b$.

$x^2(a-b) - 9(a-b)$	2 pts to here
$(x^2-9)(a-b)$	3 pts to here
$(x-3)(x+3)(a-b)$	4 pts to here

02.5d. Factor $ax^2 + cx^2 - a - c$.

$x^2(a+c) - 1(a+c)$	2 pts to here
$(x^2-1)(a+c)$	3 pts to here
$(x-1)(x+1)(a+c)$	4 pts to here

03a. Simplify $\dfrac{x^3 + 5x^2}{x^2 - 2x - 35}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{x^2(x+5)}{(x-7)(x+5)}$	3 pts to here
$\dfrac{x^2}{x-7}$	4 pts to here

03b. Simplify $\dfrac{x^3+3x^2}{x^2-2x-15}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{x^2(x+3)}{(x-5)(x+3)}$	3 pts to here
$\dfrac{x^2}{x-5}$	4 pts to here

03c. Simplify $\dfrac{x^3-9x^2}{x^2-7x-18}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{x^2(x-9)}{(x-9)(x+2)}$	3 pts to here
$\dfrac{x^2}{x+2}$	4 pts to here

03d. Simplify $\dfrac{x^3-9x^2}{x^2-11x+18}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{x^2(x-9)}{(x-9)(x-2)}$	3 pts to here
$\dfrac{x^2}{x-2}$	4 pts to here

03.5a. Simplify $\dfrac{t^2+9t+14}{2t^2-6t-20}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{(t+2)(t+7)}{2(t-5)(t+2)}$	3 pts to here
$\dfrac{t+7}{2(t-5)}$	4 pts to here

03.5b. Simplify $\dfrac{t^2+4t+3}{3t^2-9t-23}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{(t+3)(t+1)}{3(t-4)(t+1)}$	3 pts to here
$\dfrac{t+1}{3(t-4)}$	4 pts to here

03.5c. Simplify $\dfrac{t^2+8t+15}{4t^2+8t-12}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{(t+5)(t+3)}{4(t-1)(t+3)}$	3 pts to here
$\dfrac{t+5}{4(t-1)}$	4 pts to here

03.5d. Simplify $\dfrac{t^2-7t+12}{2t^2-4t-16}$.

Partial factoring of only the numerator	1 pt
Partial factoring of only the denominator	2 pts
$\dfrac{(t-3)(t-4)}{2(t+2)(t-4)}$	3 pts to here
$\dfrac{t-3}{2(t+2)}$	4 pts to here

04a. Simplify $\dfrac{24x^3}{4x^2-16} \div \dfrac{8x^2}{x^2-4x+4}$.

Factoring of equivalent of one rational expression	1 pt
$\frac{24x^3}{4(x+2)(x-2)} \div \frac{8x^2}{(x-2)^2}$	2 pts to here
$\frac{24x^3}{4(x+2)(x-2)} \times \frac{(x-2)^2}{8x^2}$	3 pts to here
$\frac{3x(x-2)}{4(x+2)}$	4 pts to here

04b. Simplify $\dfrac{15x^3}{5x^2-20} \div \dfrac{10x^2}{x^2-4x+4}$.

Factoring of equivalent of one rational expression	1 pt
$\frac{15x^3}{5(x+2)(x-2)} \div \frac{10x^2}{(x-2)^2}$	2 pts to here
$\frac{15x^3}{5(x+2)(x-2)} \times \frac{(x-2)^2}{10x^2}$	3 pts to here
$\frac{3x(x-2)}{10(x+2)}$	4 pts to here

04c. Simplify $\dfrac{16x^3}{12x^2-12} \div \dfrac{8x^2}{x^2-2x+1}$.

Factoring of equivalent of one rational expression	1 pt
$\frac{16x^3}{12(x+1)(x-1)} \div \frac{8x^2}{(x-1)^2}$	2 pts to here
$\frac{16x^3}{12(x+1)(x-1)} \times \frac{(x-1)^2}{8x^2}$	3 pts to here
$\frac{x(x-1)}{6(x+1)}$	4 pts to here

04d. Simplify $\dfrac{32x^3}{8x^2-8} \div \dfrac{16x^2}{x^2-2x+1}$.

Factoring of equivalent of one rational expression	1 pt
$\frac{32x^3}{8(x+1)(x-1)} \div \frac{16x^2}{(x-1)^2}$	2 pts to here
$\frac{32x^3}{8(x+1)(x-1)} \times \frac{(x-1)^2}{16x^2}$	3 pts to here
$\frac{x(x-1)}{4(x+1)}$	4 pts to here

04.5a. Simplify $\dfrac{15x^3}{5x-10} \div \dfrac{10x}{(x-2)(x+2)}$.

$\frac{15x^3}{5(x-2)} \div \frac{10x}{(x-2)(x+2)}$	1 pt
$\frac{15x^3}{5(x-2)} \times \frac{10x}{(x-2)(x+2)}$	2 pts to here
$\frac{3x^2(x+2)}{10}$	4 pts to here

04.5b. Simplify $\dfrac{12x^3}{3x-9} \div \dfrac{8x}{(x-3)(x+3)}$.

$\frac{12x^3}{2(x-2)} \div \frac{8x}{(x-3)(x+3)}$	1 pt
$\frac{12x^3}{2(x-2)} \times \frac{8x}{(x-3)(x+3)}$	2 pts to here
$\frac{x^2(x+3)}{2}$	4 pts to here

04.5c. Simplify $\dfrac{16x^4}{2x+4} \div \dfrac{3x}{(x-2)(x+2)}$.

$\frac{16x^4}{2(x+2)} \div \frac{3x}{(x-2)(x+2)}$	1 pt
$\frac{16x^4}{2(x+2)} \times \frac{3x}{(x-2)(x+2)}$	2 pts to here
$\frac{8x^3(x-2)}{3}$	4 pts to here

04.5d. Simplify $\dfrac{9x^2}{4x-4} \div \dfrac{18x}{(x-1)(x+1)}$.

$\frac{9x^2}{4(x-1)} \div \frac{18x}{(x-1)(x+1)}$	1 pt
$\frac{9x^2}{4(x-1)} \times \frac{18x}{(x-1)(x+1)}$	2 pts to here
$\frac{x^2(x+1)}{8x}$	4 pts to here

05a. Simplify $\dfrac{2}{x-8} - \dfrac{x}{x+3}$

$\frac{2(x+3)}{(x-8)(x+3)} - \frac{x(x-8)}{(x-8)(x+3)}$	1 pts to here
$\frac{2(x+3)-x(x-8)}{(x-8)(x+3)}$	2 pts to here
$\frac{2x+6-x^2+8x)}{(x-8)(x+3)}$	3 pts to here
$\frac{-x^2+10x+6}{(x-8)(x+3)}$	4 pts to here

05b. Simplify $\dfrac{3}{x-7} - \dfrac{x}{x+3}$

$\frac{3(x+3)}{(x-7)(x+3)} - \frac{x(x-7)}{(x-7)(x+3)}$	1 pts to here
$\frac{3(x+3)-x(x-7)}{(x-7)(x+3)}$	2 pts to here
$\frac{3x+9-x^2+7x)}{(x-7)(x+3)}$	3 pts to here
$\frac{-x^2+10x+9}{(x-7)(x+3)}$	4 pts to here

05c. Simplify $\dfrac{2}{x-6} - \dfrac{x}{x+2}$

$\frac{2(x+2)}{(x-6)(x+2)} - \frac{x(x-6)}{(x-6)(x+2)}$	1 pts to here
$\frac{2(x+2)-x(x-6)}{(x-6)(x+2)}$	2 pts to here
$\frac{2x+4-x^2+6x)}{(x-6)(x+2)}$	3 pts to here
$\frac{-x^2+8x+4}{(x-6)(x+2)}$	4 pts to here

05d. Simplify $\dfrac{4}{x-5} - \dfrac{x}{x+4}$

$\frac{4(x+4)}{(x-5)(x+4)} - \frac{x(x-5)}{(x-5)(x+4)}$	1 pts to here
$\frac{4(x+4)-x(x-5)}{(x-5)(x+4)}$	2 pts to here
$\frac{4x+16-x^2+5x)}{(x-5)(x+4)}$	3 pts to here
$\frac{-x^2+9x+16}{(x-5)(x+4)}$	4 pts to here

05.5a. Simplify $\dfrac{4n}{n^2-25} - \dfrac{3}{n+5}$

$\frac{4n}{(n-5)(n+5)} - \frac{3}{(n+5)}$	1 pts to here
$\frac{4n}{(n-5)(n+5)} - \frac{3(n-5)}{(n-5)(n+5)}$	2 pts to here
$\frac{4n-3n+15)}{(n-5)(n+5)}$	3 pts to here
$\frac{n+15}{(n-5)(n+5)}$	4 pts to here

05.5b. Simplify $\dfrac{2n}{n^2-16} - \dfrac{5}{n+4}$

$\frac{2n}{(n-4)(n+4)} - \frac{5}{(n+4)}$	1 pts to here
$\frac{2n}{(n-4)(n+4)} - \frac{5(n-4)}{(n-4)(n+4)}$	2 pts to here
$\frac{2n-5n+20)}{(n-5)(n+5)}$	3 pts to here
$\frac{-n+20}{(n-4)(n+4)}$	4 pts to here

05.5c. Simplify $\dfrac{5n}{n^2-9} - \dfrac{4}{n-3}$

$\frac{5n}{(n-3)(n+3)} - \frac{4}{(n-3)}$	1 pts to here
$\frac{5n}{(n-3)(n+3)} - \frac{4(n+3)}{(n-3)(n+3)}$	2 pts to here
$\frac{5n-4n-12)}{(n-3)(n+3)}$	3 pts to here
$\frac{n-12}{(n-3)(n+3)}$	4 pts to here

05.5d. Simplify $\dfrac{7n}{n^2-36} - \dfrac{2}{n+6}$

$\frac{7n}{(n-6)(n+6)} - \frac{2}{(n+6)}$	1 pts to here
$\frac{7n}{(n-6)(n+6)} - \frac{2(n-6)}{(n-6)(n+6)}$	2 pts to here
$\frac{7n-2n+12)}{(n-6)(n+6)}$	3 pts to here
$\frac{5n+12}{(n-6)(n+6)}$	4 pts to here

06a. Simplify $\dfrac{4x-9}{x^2-5x+6} + \dfrac{x+2}{x^2-8x+12}$.

$\frac{(4x-9)(x-6)}{(x-3)(x-2)(x-6)} + \frac{(x+2)(x-3)}{(x-6)(x-2)(x-3)}$	1 pt
$\frac{4x^2-33x+54+x^2-x-6}{(x-2)(x-6)(x-3)}$	2 pts to here
$\frac{5x^2-34x+48}{(x-2)(x-6)(x-3)}$	3 pts to here
$\frac{5x-24}{(x-6)(x-3)}$	4 pts to here

06b. Simplify $\dfrac{7x-16}{x^2-5x+6} + \dfrac{x+2}{x^2-6x+8}$.

$\frac{(7x-16)(x-4)}{(x-3)(x-2)(x-4)} + \frac{(x+2)(x-3)}{(x-4)(x-2)(x-3)}$	1 pt
$\frac{7x^2-44x+64+x^2-x-6}{(x-2)(x-4)(x-3)}$	2 pts to here
$\frac{8x^2-45x+58}{(x-2)(x-4)(x-3)}$	3 pts to here
$\frac{8x-29}{(x-4)(x-3)}$	4 pts to here

06c. Simplify $\dfrac{3x-8}{x^2-5x+6} + \dfrac{x+2}{x^2-6x+8}$.

$\frac{(3x-8)(x-4)}{(x-3)(x-2)(x-4)} + \frac{(x+2)(x-3)}{(x-4)(x-2)(x-3)}$	1 pt
$\frac{3x^2-12x+24+x^2-x-6}{(x-2)(x-4)(x-3)}$	2 pts to here
$\frac{4x^2-21x+26}{(x-2)(x-4)(x-3)}$	3 pts to here
$\frac{4x-13}{(x-4)(x-3)}$	4 pts to here

06d. Simplify $\dfrac{3x+5}{x^2+4x+3}+\dfrac{-x+5}{x^2+2x-3}$.

$\frac{(3x+5)(x-1)}{(x+1)(x+3)(x-1)}+\frac{(-x+5)(x+1)}{(x+3)(x-1)(x+1)}$	1 pt
$\frac{3x^2+2x-5-x^2+4x+5}{(x+3)(x-1)(x+1)}$	2 pts to here
$\frac{2x^2+6x}{(x+3)(x-1)(x+1)}$	3 pts to here
$\frac{2x}{(x-1)(x+1)}$	4 pts to here

06.5a. Simplify $\dfrac{2x+5}{x^2+6x+5}+\dfrac{-x+3}{2x+10}$.

$\frac{(2x+5)}{(x+5)(x+1)}+\frac{(-x+3)}{2(x+5)}$	1 pt
$\frac{2(2x+5)}{2(x+5)(x+1)}+\frac{(-x+3)(x+1)}{2(x+5)(x+1)}$	2 pt
$\frac{4x+10-x^2+2x+3}{2(x+5)(x+1}$	3 pts to here
$\frac{-x^2+6x+13}{2(x+5)(x+1)}$	4 pts to here

06.5b. Simplify $\dfrac{3x+4}{x^2+5x+4}+\dfrac{-x+2}{3x+12}$.

$\frac{(3x+4)}{(x+4)(x+1)}+\frac{(-x+2)}{3(x+4)}$	1 pt
$\frac{3(3x+4)}{3(x+4)(x+1)}+\frac{(-x+2)(x+1)}{3(x+4)(x+1)}$	2 pt
$\frac{9x+12-x^2+x+2}{3(x+4)(x+1}$	3 pts to here
$\frac{-x^2+10x+14}{3(x+4)(x+1)}$	4 pts to here

06.5c. Simplify $\dfrac{4x+5}{x^2+7x+6}+\dfrac{-x+4}{4x+24}$.

$\frac{(4x+5)}{(x+6)(x+1)}+\frac{(-x+4)}{4(x+6)}$	1 pt
$\frac{4(4x+5)}{4(x+6)(x+1)}+\frac{(-x+4)(x+1)}{4(x+6)(x+1)}$	2 pt
$\frac{16x+20-x^2+3x+4}{4(x+6)(x+1}$	3 pts to here
$\frac{-x^2+19x+24}{4(x+6)(x+1)}$	4 pts to here

06.5d. Simplify $\dfrac{5x+3}{x^2+4x+3}+\dfrac{-x+6}{5x+15}$.

$\frac{(5x+3)}{(x+3)(x+1)}+\frac{(-x+6)}{5(x+3)}$	1 pt
$\frac{5(5x+3)}{5(x+3)(x+1)}+\frac{(-x+6)(x+1)}{5(x+3)(x+1)}$	2 pt
$\frac{25x+15-x^2+5x+6}{5(x+3)(x+1}$	3 pts to here
$\frac{-x^2+30x+21}{5(x+3)(x+1)}$	4 pts to here

07a. Simplify $\dfrac{\frac{a}{3b}-\frac{1}{2}}{\frac{7}{3b}-\frac{4}{a}}$.

Method 1	
$\frac{6ab}{6ab}(\frac{\frac{a}{3b}-\frac{1}{2}}{\frac{7}{3b}-\frac{4}{a}})$	2 pts to here
$\frac{2a^2-3ab}{14a-24b}$	4 pts to here
Method 2	
$\frac{\frac{2a}{6b}-\frac{3b}{6b}}{\frac{7a}{3ab}-\frac{12b}{3ab}}$	1 pt to here
$\frac{\frac{2a-3b}{6b}}{\frac{7a-12b}{3ab}}$	2 pts to here
$\frac{2a-3b}{6b}\times\frac{3ab}{7a-12b}$	3 pts to here
$\frac{a(2a-3b)}{2(7a-12b)}$ or $\frac{2a^2-3ab}{14a-24b}$	4 pts to here

07b. Simplify $\frac{\frac{a}{5b}-\frac{1}{4}}{\frac{7}{5b}-\frac{3}{a}}$.

Method 1	
$\frac{20ab}{20ab}(\frac{\frac{a}{5b}-\frac{1}{4}}{\frac{7}{5b}-\frac{3}{a}})$	2 pts to here
$\frac{4a^2-5ab}{28a-60b}$	4 pts to here
Method 2	
$\frac{\frac{4a}{20b}-\frac{5b}{20b}}{\frac{7a}{5ab}-\frac{15b}{5ab}}$	1 pt to here
$\frac{\frac{4a-5b}{20b}}{\frac{7a-15b}{5ab}}$	2 pts to here
$\frac{4a-5b}{20b}\times\frac{5ab}{7a-15b}$	3 pts to here
$\frac{a(4a-5b)}{4(7a-15b)}$ or $\frac{4a^2-5ab}{28a-60b}$	4 pts to here

07c. Simplify $\dfrac{\dfrac{a}{4b}-\dfrac{1}{3}}{\dfrac{5}{4b}-\dfrac{4}{a}}$.

Method 1	
$\dfrac{12ab}{12ab}\left(\dfrac{\dfrac{a}{4b}-\dfrac{1}{3}}{\dfrac{5}{4b}-\dfrac{4}{a}}\right)$	2 pts to here
$\dfrac{3a^2-4ab}{15a-48b}$	4 pts to here
Method 2	
$\dfrac{\dfrac{3a}{12b}-\dfrac{4b}{12b}}{\dfrac{5a}{4ab}-\dfrac{16b}{4ab}}$	1 pt to here
$\dfrac{\dfrac{3a-4b}{12b}}{\dfrac{5a-16b}{4ab}}$	2 pts to here
$\dfrac{3a-4b}{12b}\times\dfrac{4ab}{5a-16b}$	3 pts to here
$\dfrac{a(3a-4b)}{3(5a-16b)}$ or $\dfrac{3a^2-4ab}{15a-48b}$	4 pts to here

07d. Simplify $\dfrac{\dfrac{a}{5b}-\dfrac{1}{4}}{\dfrac{3}{4b}-\dfrac{2}{a}}$.

Method 1	
$\frac{20ab}{20ab}(\frac{\frac{a}{5b}-\frac{1}{4}}{\frac{3}{4b}-\frac{2}{a}})$	2 pts to here
$\frac{4a^2-5ab}{15a-40b}$	4 pts to here
Method 2	
$\frac{\frac{4a}{20b}-\frac{5b}{20b}}{\frac{3a}{4ab}-\frac{8b}{4ab}}$	1 pt to here
$\frac{\frac{4a-5b}{12b}}{\frac{3a-8b}{4ab}}$	2 pts to here
$\frac{4a-5b}{12b}\times\frac{4ab}{3a-8b}$	3 pts to here
$\frac{a(4a-5b)}{5(3a-8b)}$ or $\frac{4a^2-5ab}{15a-40b}$	4 pts to here

07.5a. Simplify $\frac{\frac{3}{x}}{\frac{5}{x}+\frac{3}{x^2}}$.

Method 1	
$\frac{x^2}{x^2}\left(\frac{\frac{3}{x}}{\frac{5}{x}+\frac{3}{x^2}}\right)$	2 pts to here
$\frac{3x}{5x+3}$	4 pts to here
Method 2	
$\frac{\frac{3}{x}}{\frac{5x}{x^2}+\frac{3}{x^2}}$	1 pt to here
$\frac{\frac{3}{x}}{\frac{5x+3}{x^2}}$	2 pts to here
$\frac{3}{x}\times\frac{x^2}{5x+3}$	3 pts to here
$\frac{3x}{5x+3}$	4 pts to here

07.5b. Simplify $\dfrac{\dfrac{4}{x}}{\dfrac{7}{x}+\dfrac{4}{x^2}}$.

Method 1	
$\dfrac{x^2}{x^2}\left(\dfrac{\dfrac{4}{x}}{\dfrac{7}{x}+\dfrac{4}{x^2}}\right)$	2 pts to here
$\dfrac{4x}{7x+4}$	4 pts to here
Method 2	
$\dfrac{\dfrac{4}{x}}{\dfrac{7x}{x^2}+\dfrac{4}{x^2}}$	1 pt to here
$\dfrac{\dfrac{4}{x}}{\dfrac{7x+4}{x^2}}$	2 pts to here
$\dfrac{4}{x}\times\dfrac{x^2}{7x+4}$	3 pts to here
$\dfrac{4x}{7x+4}$	4 pts to here

07.5c. Simplify $\dfrac{\dfrac{5}{x}}{\dfrac{6}{x}+\dfrac{4}{x^2}}$.

Method 1	
$\dfrac{x^2}{x^2}\left(\dfrac{\dfrac{5}{x}}{\dfrac{6}{x}+\dfrac{4}{x^2}}\right)$	2 pts to here
$\dfrac{5x}{6x+4}$	4 pts to here
Method 2	
$\dfrac{\dfrac{5}{x}}{\dfrac{6x}{x^2}+\dfrac{4}{x^2}}$	1 pt to here
$\dfrac{\dfrac{5}{x}}{\dfrac{6x+4}{x^2}}$	2 pts to here
$\dfrac{5}{x}\times\dfrac{x^2}{6x+4}$	3 pts to here
$\dfrac{5x}{6x+4}$	4 pts to here

07.5d. Simplify $\dfrac{\dfrac{7}{x}}{\dfrac{3}{x}+\dfrac{8}{x^2}}$.

Method 1	
$\dfrac{x^2}{x^2}\left(\dfrac{\dfrac{7}{x}}{\dfrac{3}{x}+\dfrac{8}{x^2}}\right)$	2 pts to here
$\dfrac{7x}{3x+8}$	4 pts to here
Method 2	
$\dfrac{\dfrac{7}{x}}{\dfrac{3x}{x^2}+\dfrac{8}{x^2}}$	1 pt to here
$\dfrac{\dfrac{7}{x}}{\dfrac{3x+8}{x^2}}$	2 pts to here
$\dfrac{7}{x}\times\dfrac{x^2}{3x+8}$	3 pts to here
$\dfrac{7x}{3x+8}$	4 pts to here

08a. Solve $\dfrac{2}{x^2-4}+\dfrac{5}{x+2}=\dfrac{2}{x-2}$.

$2+5(x-2)=2(x+2)$	2 pts to here
$5x-8=2x+4$	3 pts to here
$x=4$	4 pts to here

08b. Solve $\dfrac{2}{x^2-1}+\dfrac{5}{x+1}=\dfrac{3}{x-1}$.

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

08c. Solve $\dfrac{4}{x^2-1}+\dfrac{7}{x+1}=\dfrac{5}{x-1}$.

$4+7(x-1)=5(x+1)$	2 pts to here
$7x-3=5x+5$	3 pts to here
$x=4$	4 pts to here

08d. Solve $\dfrac{x-1}{x^2-4}=\dfrac{2}{x+2}+\dfrac{4}{x-2}$.

$x - 1 = 2(x - 2) + 4(x + 2)$	2 pts to here
$x - 1 = 6x + 4$	3 pts to here
$x = -1$	4 pts to here

08.5a. Solve $\dfrac{5}{2} = \dfrac{2x + 3}{x + 5} + 4$.

$5(x - 2) = 2(2x + 3) + 4(2)(x + 5)$	1 pts to here
$5x + 25 = 4x + 6 + 8x + 40$	2 pts to here
$5x + 25 = 12x + 46$	3 pts to here
$-3 = x$	4 pts to here

08.5b. Solve $\dfrac{7}{3} = \dfrac{3x + 4}{x + 7} + 5$.

$7(x + 7) = 3(3x + 4) + 5(3)(x + 7)$	1 pts to here
$7x + 49 = 9x + 12 + 15x + 105$	2 pts to here
$7x + 49 = 24x + 117$	3 pts to here
$-4 = x$	4 pts to here

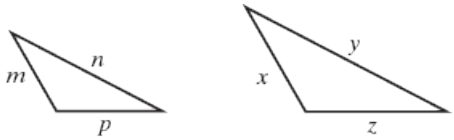
08.5c. Solve $\dfrac{5}{4} = \dfrac{4x + 5}{x + 10} + 6$.

$5(x + 10) = 4(4x + 5) + 4(6)(x + 10)$	1 pts to here
$5x + 50 = 16x + 20 + 24x + 240$	2 pts to here
$5x + 50 = 40x + 260$	3 pts to here
$-6 = x$	4 pts to here

08.5d. Solve $\dfrac{11}{4} = \dfrac{3x + 2}{x + 9} + 6$.

$11(x + 9) = 4(3x + 2) + 4(6)(x + 9)$	1 pts to here
$11x + 99 = 12x + 8 + 24x + 216$	2 pts to here
$11x + 99 = 36x + 224$	3 pts to here
$-5 = x$	4 pts to here

09a. Triangles A and B are similar.

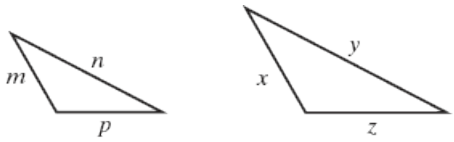


Triangle A Triangle B

If $x = 21$ in., $y = 23$ in., and $m = 19$ in., find the length of side n. Leave your answer as a fraction.

$\frac{19}{21} = \frac{n}{23}$ or $\frac{19}{n} = \frac{21}{23}$ or $\frac{21}{19} = \frac{23}{n}$ or $\frac{n}{19} = \frac{23}{21}$	2 pts to here
$n = \frac{437}{21}$ inches or $n = 20\frac{17}{21}$ inches	4 pts to here
(3 pts for correct solution, but no units are given)	

09b. Triangles A and B are similar.

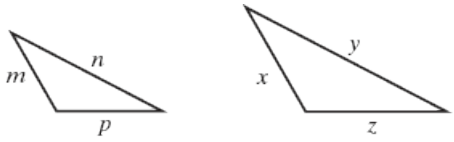


Triangle A Triangle B

If $x = 21$ in., $y = 29$ in., and $m = 17$ in., find the length of side n. Leave your answer as a fraction.

$\frac{17}{21} = \frac{n}{29}$ or $\frac{17}{n} = \frac{21}{29}$ or $\frac{21}{17} = \frac{29}{n}$ or $\frac{n}{17} = \frac{29}{21}$	2 pts to here
$n = \frac{493}{21}$ inches or $n = 23\frac{10}{21}$ inches	4 pts to here
(3 pts for correct solution, but no units are given)	

09c. Triangles A and B are similar.

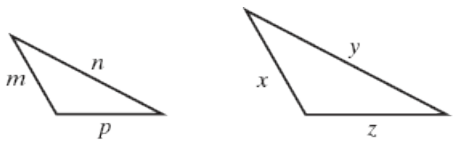


Triangle A Triangle B

If $x = 20$ in., $y = 29$ in., and $m = 13$ in., find the length of side y. Leave your answer as a fraction.

$\frac{13}{20} = \frac{n}{29}$ or $\frac{13}{n} = \frac{20}{29}$ or $\frac{20}{13} = \frac{29}{n}$ or $\frac{n}{13} = \frac{20}{29}$	2 pts to here
$n = \frac{377}{20}$ inches or $n = 18\frac{17}{20}$ inches	4 pts to here
(3 pts for correct solution, but no units are given)	

09d. Triangles A and B are similar.



Triangle A Triangle B

If $z = 18$ in., $y = 25$ in., and $n = 9$ in., find the length of side p. Leave your answer as a fraction.

$\frac{9}{25} = \frac{p}{18}$ or	
$\frac{9}{p} = \frac{25}{18}$ or	
$\frac{25}{9} = \frac{18}{p}$ or	
$\frac{p}{9} = \frac{18}{25}$	2 pts to here
$p = \frac{162}{25}$ inches or $p = 6\frac{12}{25}$ inches	4 pts to here
(3 pts for correct solution, but no units are given)	

09.5a. A contractor estimated that 15 square feet of window space will be allowed for every 160 square feet of floor space. Using this estimate, how much window space will be allowed for 3200 square feet of floor space?

$\frac{x}{3200} = \frac{15}{160}$ or	
$\frac{x}{15} = \frac{3200}{160}$ or	
$\frac{15}{160} = \frac{x}{3200}$	2 pts to here
$160x = 48000$	3 pts to here
$x = 300$ square feet	4 pts to here
(3 pts for correct solution, but no units are given)	

09.5b. A contractor estimated that 20 square feet of window space will be allowed for every 210 square feet of floor space. Using this estimate, how much window space will be allowed for 4200 square feet of floor space?

$\frac{x}{4200} = \frac{20}{210}$ or	
$\frac{x}{20} = \frac{4200}{210}$ or	
$\frac{20}{210} = \frac{x}{4200}$	2 pts to here
$210x = 84000$	3 pts to here
$x = 400$ square feet	4 pts to here
(3 pts for correct solution, but no units are given)	

09.5c. A contractor estimated that 35 square feet of window space will be allowed for every 180 square feet of floor space. Using this estimate, how much window space will be allowed for 3600 square feet of floor space?

$\frac{x}{3600} = \frac{35}{180}$ or	
$\frac{x}{35} = \frac{3600}{180}$ or	
$\frac{35}{180} = \frac{x}{3600}$	2 pts to here
$180x = 126000$	3 pts to here
$x = 700$ square feet	4 pts to here
(3 pts for correct solution, but no units are given)	

09.5d. A contractor estimated that 45 square feet of window space will be allowed for every 140 square feet of floor space. Using this estimate, how much window space will be allowed for 2800 square feet of floor space?

$\frac{x}{2800} = \frac{45}{140}$ or $\frac{x}{45} = \frac{2800}{140}$ or $\frac{45}{140} = \frac{x}{2800}$	2 pts to here
$140x = 126000$	3 pts to here
$x = 900$ square feet	4 pts to here
(3 pts for correct solution, but no units are given)	

10a. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{45x} - \sqrt{128x} + \sqrt{72x}$.

$3\sqrt{5x} - 8\sqrt{2x} + 6\sqrt{2x}$	2 pts to here
$3\sqrt{5x} - 2\sqrt{2x}$	4 pts to here

10b. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{28x} - \sqrt{147x} + \sqrt{75x}$

$2\sqrt{7x} - 7\sqrt{3x} + 5\sqrt{3x}$	2 pts to here
$2\sqrt{7x} - 2\sqrt{3x}$	4 pts to here

10c. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{63x} - \sqrt{54x} + \sqrt{24x}$

$3\sqrt{7x} - 3\sqrt{6x} + 2\sqrt{6x}$	2 pts to here
$3\sqrt{7x} - \sqrt{6x}$	4 pts to here

10d. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{44x} - \sqrt{63x} + \sqrt{112x}$

$2\sqrt{11x} - 3\sqrt{7x} + 4\sqrt{7x}$	2 pts to here
$2\sqrt{11x} + \sqrt{7x}$	4 pts to here

10.5a. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{108x} - 2\sqrt{18x} - \sqrt{48x}$.

$6\sqrt{3x} - 6\sqrt{2x} - 4\sqrt{3x}$	2 pts to here
$2\sqrt{3x} - 6\sqrt{2x}$	4 pts to here

10.5b. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{175x} - 3\sqrt{80x} - \sqrt{63x}$.

$5\sqrt{7x} - 12\sqrt{5x} - 3\sqrt{7x}$	2 pts to here
$2\sqrt{7x} - 12\sqrt{5x}$	4 pts to here

10.5c. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{150x} - 3\sqrt{112x} - \sqrt{54x}$.

$5\sqrt{6x} - 12\sqrt{7x} - 3\sqrt{6x}$	2 pts to here
$2\sqrt{6x} - 12\sqrt{7x}$	4 pts to here

10.5d. Combine. Assume that all variables represent nonnegative real numbers. $\sqrt{180x} - 5\sqrt{63x} - \sqrt{80x}$.

$6\sqrt{5x} - 15\sqrt{7x} - 4\sqrt{5x}$	2 pts to here
$2\sqrt{5x} - 15\sqrt{7x}$	4 pts to here

11a. Simplify $\dfrac{\sqrt{3}+3}{\sqrt{3}-3}$.

$\frac{\sqrt{3}+3}{\sqrt{3}-3} \times \frac{\sqrt{3}+3}{\sqrt{3}+3}$	2 pts to here
$\frac{3+3\sqrt{3}+3\sqrt{3}+9}{3-9}$	3 pts to here
$\frac{12+6\sqrt{3}}{-6}$	
$-2-\sqrt{3}$	4 pts to here

11b. Simplify $\dfrac{\sqrt{5}+3}{\sqrt{5}-3}$.

$\frac{\sqrt{5}+3}{\sqrt{5}-3} \times \frac{\sqrt{5}+3}{\sqrt{5}+3}$	2 pts to here
$\frac{5+3\sqrt{5}+3\sqrt{5}+9}{5-9}$	3 pts to here
$\frac{14+6\sqrt{3}}{-4}$	
$\frac{-7-3\sqrt{5}}{-2}$	4 pts to here

11c. Simplify $\dfrac{\sqrt{5}-3}{\sqrt{5}+3}$.

$\frac{\sqrt{5}-3}{\sqrt{5}+3} \times \frac{\sqrt{5}-3}{\sqrt{5}-3}$	2 pts to here
$\frac{5-3\sqrt{5}-3\sqrt{5}+9}{5-9}$	3 pts to here
$\frac{14-6\sqrt{3}}{-4}$	
$\frac{-7+3\sqrt{5}}{-2}$	4 pts to here

11d. Simplify $\dfrac{\sqrt{3}-3}{\sqrt{3}+3}$.

$\frac{\sqrt{3}-3}{\sqrt{3}+3} \times \frac{\sqrt{3}-3}{\sqrt{3}-3}$	2 pts to here
$\frac{3-3\sqrt{3}-3\sqrt{3}+9}{3-9}$	3 pts to here
$\frac{12-6\sqrt{3}}{-6}$	
$-2+\sqrt{3}$	4 pts to here

11.5a. At 3 p.m., Coretta's shadow is 1.23 meters long. Her height is 1.72 meters. At the same time, a tree's shadow is 3.08 meters long. How tall is the tree?

$\frac{x}{3.08} = \frac{1.72}{1.23}$ or $\frac{1.72}{x} = \frac{1.23}{3.08}$ or other correct proportions	(3 pts to here)
correct denominator elimination	(4 pts to here)
$x = 4.31$	(5 pts to here)
The tree is 4.31 meters tall.	(6 pts to here)

11.5b. At 5 p.m., Coretta's shadow is 2.33 meters long. Her height is 1.81 meters. At the same time, a tree's shadow is 5.84 meters long. How tall is the tree?

$\frac{x}{5.84} = \frac{1.81}{2.33}$ or $\frac{1.81}{x} = \frac{2.33}{5.84}$ or other correct proportions	(3 pts to here)
correct denominator elimination	(4 pts to here)
$x = 4.54$	(5 pts to here)
The tree is 4.54 meters tall.	(6 pts to here)

11.5c. At 11 a.m., Julia's shadow is 0.98 meters long. Her height is 1.59 meters. At the same time, a tree's shadow is 3.08 meters long. How tall is the tree?

$\frac{x}{3.08} = \frac{1.59}{0.98}$ or $\frac{1.59}{x} = \frac{0.98}{3.08}$ or other correct proportions	(3 pts to here)
correct denominator elimination	(4 pts to here)
$x = 5.00$	(5 pts to here)
The tree is 5.00 meters tall.	(6 pts to here)

11.5d. At 12 p.m., Julia's shadow is 0.48 meters long. Her height is 1.72 meters. At the same time, a tree's shadow is 3.61 meters long. How tall is the tree?

$\frac{x}{3.61} = \frac{1.72}{0.48}$ or $\frac{1.72}{x} = \frac{0.48}{3.61}$ or other correct proportions	(3 pts to here)
correct denominator elimination	(4 pts to here)
$x = 12.94$	(5 pts to here)
The tree is 12.94 meters tall.	(6 pts to here)

12a. Solve $\sqrt{x+8} - 8 = x$.

$\sqrt{x+8} = x+8$	
$x + 8 = x^2 + 16x + 64$	1 pt to here
$0 = x^2 + 15x + 56$	2 pts to here
$0 = (x+7)(x+8)$	3 pts to here
$x = -7$ and $x = -8$	4 pts to here

12b. Solve $\sqrt{x+9} - 9 = x$.

$\sqrt{x+9} = x+9$	
$x + 9 = x^2 + 18x + 81$	1 pt to here
$0 = x^2 + 17x + 72$	2 pts to here
$0 = (x+9)(x+8)$	3 pts to here
$x = -9$ and $x = -8$	4 pts to here

12c. Solve $\sqrt{x+10} - 10 = x$.

$\sqrt{x+10} = x+10$	
$x+10 = x^2+20x+100$	1 pt to here
$0 = x^2+19x+90$	2 pts to here
$0 = (x+9)(x+10)$	3 pts to here
$x = -9$ and $x = -10$	4 pts to here

12d. Solve $\sqrt{x+7} - 7 = x$.

$\sqrt{x+7} = x+7$	
$x+7 = x^2+14x+49$	1 pt to here
$0 = x^2+13x+42$	2 pts to here
$0 = (x+6)(x+7)$	3 pts to here
$x = -6$ and $x = -7$	4 pts to here

12.5a. Solve $\sqrt{3x-6} - 4 = 2$.

$\sqrt{3x-6} = 6$	1 pt to here
$3x-6 = 36$	2 pts to here
$3x = 42$	3 pts to here
$x = 14$	4 pts to here

12.5b. Solve $\sqrt{8x+17} - 2 = 9$.

$\sqrt{8x+17} = 11$	1 pt to here
$8x+17 = 121$	2 pts to here
$8x = 104$	3 pts to here
$x = 13$	4 pts to here

12.5c. Solve $\sqrt{5x+9} - 4 = 4$.

$\sqrt{5x+9} = 8$	1 pt to here
$5x+9 = 64$	2 pts to here
$5x = 55$	3 pts to here
$x = 11$	4 pts to here

12.5d. Solve $\sqrt{4x-36} - 2 = 2$.

$\sqrt{4x-36} = 4$	1 pt to here
$4x-36 = 16$	2 pts to here
$4x = 52$	3 pts to here
$x = 13$	4 pts to here

13a. Simplify $\sqrt{-16}$.

$\sqrt{-1}\sqrt{16}$	1 pts to here
$4\sqrt{-1}$	2 pts to here or
$i\sqrt{16}$	3 pts to here
$4i$	4 pts to here

13b. Simplify $\sqrt{-25}$.

$\sqrt{-1}\sqrt{25}$	1 pts to here
$5\sqrt{-1}$	2 pts to here or
$i\sqrt{25}$	3 pts to here
$5i$	4 pts to here

13c. Simplify $\sqrt{-9}$.

$\sqrt{-1}\sqrt{9}$	1 pts to here
$3\sqrt{-1}$	2 pts to here or
$i\sqrt{9}$	3 pts to here
$3i$	4 pts to here

13d. Simplify $\sqrt{-36}$.

$\sqrt{-1}\sqrt{36}$	1 pts to here
$6\sqrt{-1}$	2 pts to here or
$i\sqrt{36}$	3 pts to here
$6i$	4 pts to here

13.5a. Simplify $5 - \sqrt{-18}$.

$5 - \sqrt{-1}\sqrt{18}$	1 pts to here
$5 - 3\sqrt{-1}\sqrt{2}$	2 pts to here or
$5 - i\sqrt{18}$	3 pts to here
$5 - 3i\sqrt{2}$	4 pts to here

13.5b. Simplify $10 + \sqrt{-50}$.

$10 + \sqrt{-1}\sqrt{50}$	1 pts to here
$10 + 5\sqrt{-1}\sqrt{2}$	2 pts to here or
$10 + i\sqrt{50}$	3 pts to here
$10 + 5i\sqrt{2}$	4 pts to here

13.5c. Simplify $2 + \sqrt{-45}$.

$2 + \sqrt{-1}\sqrt{45}$	1 pts to here
$2 + 3\sqrt{-1}\sqrt{5}$	2 pts to here or
$2 + i\sqrt{45}$	3 pts to here
$2 + 3i\sqrt{5}$	4 pts to here

13.5d. Simplify $3 - \sqrt{-28}$.

$3 - \sqrt{-1}\sqrt{28}$	1 pts to here
$3 - 2\sqrt{-1}\sqrt{7}$	2 pts to here or
$3 - i\sqrt{28}$	3 pts to here
$3 - 2i\sqrt{7}$	4 pts to here

14a. y varies directly as x and inversely as the square of z. If $y = 84$ when $x = 54$ and $z = 3$, find y when $x = 48$ and $z = 4$.

$y = \frac{kx}{z^2}$	
$84 = \frac{k(54)}{3^2}$	2 pts to here
$84 = 6k$	
$14 = k$	3 pts to here
$y = \frac{14x}{z^2}$	
$y = \frac{14(48)}{4^2}$	5 pts to here
$y = 42$	6 pts to here

14b. y varies directly as x and inversely as the square of z. If $y = 64$ when $x = 32$ and $z = 4$, find y when $x = 75$ and $z = 5$.

$y = \frac{kx}{z^2}$	
$64 = \frac{k(32)}{4^2}$	2 pts to here
$64 = 2k$	
$32 = k$	3 pts to here
$y = \frac{32x}{z^2}$	
$y = \frac{32(75)}{5^2}$	5 pts to here
$y = 96$	6 pts to here

14c. y varies directly as x and inversely as the square of z. If $y = 56$ when $x = 175$ and $z = 5$, find y when $x = 98$ and $z = 7$.

$y = \frac{kx}{z^2}$	
$56 = \frac{k(175)}{5^2}$	2 pts to here
$56 = 7k$	
$8 = k$	3 pts to here
$y = \frac{8x}{z^2}$	
$y = \frac{8(98)}{7^2}$	5 pts to here
$y = 16$	6 pts to here

14d. y varies directly as x and inversely as the square of z. If $y = 84$ when $x = 64$ and $z = 4$, find y when $x = 12$ and $z = 2$.

$y = \frac{kx}{z^2}$	
$84 = \frac{k(64)}{4^2}$	2 pts to here
$84 = 4k$	
$21 = k$	3 pts to here
$y = \frac{21x}{z^2}$	
$y = \frac{21(12)}{2^2}$	5 pts to here
$y = 63$	6 pts to here

14.3a. The commission earned by a salesman varies directly as his gross sales. In one month, he earned a commission of $\$2,700$ on $\$18,000$ in gross sales.

(a) Write an equation relating the commission earned to the amount of gross sales in one month.

(b) Find the commission on $\$22,000$ in gross sales.

(a) $C = ks$ (or other variables)	2 pts to here
(a) $C = \frac{2700}{18000}s$ or $C = \frac{3}{20}s$	3 pts to here
(b) $C = \frac{3}{20}22000$ or $C = 3300$	5 pts to here
(b) \$3300	6 pts to here

14.3b. The number of AUD (Australian dollars) received varies directly as the number of USD (U.S. dollars) exchanged. In 2009, one could exchange 700 USD for 1085 AUD.

(a) Write an equation relating AUD to USD.

(b) In 2009, 1000 USD could be exchanged for how many AUD?

(a) $A = kU$ (or other variables)	2 pts to here
(a) $A = \frac{1085}{700}U$ or $A = \frac{31}{20}U$	3 pts to here
(b) $A = \frac{31}{20}1000$ or $A = 1550$	5 pts to here
(b) 1550 AUD	6 pts to here

14.3c. The volume of jet fuel used at cruising altitude by an MD80 passenger jet is directly proportional to time in flight. In flying at cruising altitude for 36 minutes, an MD80 uses 388 gallons of jet fuel.

(a) Write an equation relating the amount of jet fuel used at cruising altitude to time at cruising altitude.

(b) Find the amount of jet fuel used by flying at cruising altitude for 90 minutes.

(a) $V = kt$	2 pts to here
(a) $V = \frac{388}{36}t$ or $V = \frac{97}{9}t$	3 pts to here
(b) $V = \frac{97}{9}90$ or $V = 970$	5 pts to here
(b) 970 gallons	6 pts to here

14.3d. A patient has an insurance policy that requires a copayment that varies directly with her medical expenses. Her last bill listed her expenses at \$1289 with a copayment of \$154.68.

(a) Write an equation relating her copayment to her medical expenses.

(b) Find her copayment for medical expenses totalling \$2000.

(a) $c = km$	2 pts to here
(a) $c = \frac{154.68}{1289}m$ or $V = 0.12m$	23 pts to here
(b) $c = 0.12(2000)$ or $c = 240$	5 pts to here
(b) \$240	6 pts to here

14.7a. The weight of an astronaut varies inversely as the square of his distance from the center of Earth. An astronaut weighs 112 pounds when he is 5000 miles from the center of Earth.

(a) Write an equation relating the astronaut's weight to his distance from the center of Earth.

(b) Find the weight of the astronaut at 20000 miles from the center of Earth.

(a) $W = \frac{k}{d^2}$ (or other variables)	2 pts to here
(a) $W = \frac{2800000000}{d^2}$	3 pts to here
(b) $W = \frac{2800000000}{20000^2}$ or $C = 7$	5 pts to here
(b) 7 pounds	6 pts to here

14.7b. If temperature remains constant, the volume of gas varies inversely as the pressure of the gas on its container. A pressure of 60 pounds per square inch corresponds to a volume of 45 cubic inches.

(a) Write an equation relating pressure to volume.

(b) What pressure corresponds to a volume of 70 cubic inches?

(a) $V = \frac{k}{P}$ (or other variables)	2 pts to here
(a) $V = \frac{2700}{P}$	3 pts to here
(b) $V = \frac{2700}{100}$ or $C = 27$	5 pts to here
(b) 27 pounds per square inch	6 pts to here

14.7c. The time it takes to fill a tub is inversely proportional to the square of the radius of the pipe used to fill it. When a pipe of radius 2.5 inches is used, the tub fills in 7.2 minutes.

(a) Write an equation relating the time it takes to fill the tub to the radius of the pipe used to fill it.

(b) Find the time to fill the tub using a pipe of radius 3.

(a) $T = \frac{k}{r^2}$ (or other variables)	2 pts to here
(a) $T = \frac{45}{r^2}$	3 pts to here
(b) $T = \frac{45}{9}$ or $C = 5$	5 pts to here
(b) 5 minutes	6 pts to here

14.7d. The time it takes to get a sunburn is inversely proportional to the UV (ultraviolet) rating. At a UV rating of 6, it takes 15 minutes to get a sunburn.

(a) Write an equation relating the time it takes to get a sumburn to the UV rating.

(b) Find the time it takes to get a sunburn when the UV rating is 10.

(a) $T = \frac{k}{U}$ (or other variables)	2 pts to here
(a) $T = \frac{90}{U}$	3 pts to here
(b) $T = \frac{90}{10}$ or $C = 9$	5 pts to here
(b) 9 minutes	6 pts to here

15a. Solve by using the square root property. $(2x + 7)^2 = 81$.

$2x + 7 = \pm 9$	1 pt to here
$2x = 2$	
$x = 1$	2 pts to here
$2x = -16$	3 pts to here
$x = -8$	4 pts

15b. Solve by using the square root property. $(2x + 7)^2 = 121$.

$2x + 7 = \pm 11$	1 pt to here
$2x = 4$	
$x = 2$	2 pts to here
$2x = -18$	3 pts to here
$x = -9$	4 pts

15c. Solve by using the square root property. $(2x + 3)^2 = 81$.

$2x + 3 = \pm 9$	1 pt to here
$2x = 6$	
$x = 3$	2 pts to here
$2x = -12$	3 pts to here
$x = -6$	4 pts

15d. Solve by using the square root property. $(2x + 5)^2 = 81$.

$2x + 5 = \pm 9$	1 pt to here
$2x = 4$	
$x = 2$	2 pts to here
$2x = -14$	3 pts to here
$x = -7$	4 pts

15.5a. Solve by using the square root property. $(2x-10)^2 = 7$.

$2x - 10 = \pm\sqrt{7}$	1 pt to here
$2x = 10 + \sqrt{7}$	
$x = \dfrac{10+\sqrt{7}}{2}$	2 pts to here
$2x = 10 - \sqrt{7}$	3 pts to here
$x = \dfrac{10-\sqrt{7}}{2}$	4 pts

15.5b. Solve by using the square root property. $(6x-3)^2 = 2$.

$6x - 3 = \pm\sqrt{2}$	1 pt to here
$6x = 3 + \sqrt{2}$	
$x = \dfrac{3+\sqrt{2}}{6}$	2 pts to here
$6x = 3 - \sqrt{2}$	3 pts to here
$x = \dfrac{3-\sqrt{2}}{6}$	4 pts

15.5c. Solve by using the square root property. $(11x-2)^2 = 6$.

$11x - 2 = \pm\sqrt{6}$	1 pt to here
$11x = 2 + \sqrt{6}$	
$x = \dfrac{2+\sqrt{6}}{11}$	2 pts to here
$11x = 2 - \sqrt{6}$	3 pts to here
$x = \dfrac{2-\sqrt{6}}{11}$	4 pts

15.5d. Solve by using the square root property. $(3x-1)^2 = 5$.

$3x - 10 = \pm\sqrt{7}$	1 pt to here
$3x = 10 + \sqrt{7}$	
$x = \dfrac{10+\sqrt{7}}{3}$	2 pts to here
$3x = 10 - \sqrt{7}$	3 pts to here
$x = \dfrac{10-\sqrt{7}}{3}$	4 pts

16a. A company that manufactures bikes makes a daily profit, P, according to the equation $P(x) = -100x^2 + 5000x - 55444$ where P is measured in dollars and x is the number of mountain bikes made per day. Find the number of mountain bikes that must be made each day to produce a zero profit for the company. Round your answer to the nearest whole number.

$x = \frac{-5000 \pm \sqrt{(5000)^2 - 4(-100)(-55444)}}{2(-100)}$	1 pt to here
$x = \frac{-5000 \pm \sqrt{2822400}}{-200}$	2 pts to here
$x = \frac{-5000+1680}{-200} = 16.6 \approx 17$ bikes	3 pts to here
$x = \frac{-5000-1680}{-200} = 33.4 \approx 33$ bikes	4 pts to here (3 pts if no units)

16b. A company that manufactures bikes makes a daily profit, P, according to the equation $P(x) = -100x^2 + 4700x - 49449$ where P is measured in dollars and x is the number of mountain bikes made per day. Find the number of mountain bikes that must be made each day to produce a zero profit for the company. Round your answer to the nearest whole number.

$x = \frac{-4700 \pm \sqrt{(4700)^2 - 4(-100)(-49449)}}{2(-100)}$	1 pt to here
$x = \frac{-4700 \pm \sqrt{2310400}}{-200}$	2 pts to here
$x = \frac{-4700+1520}{-200} = 15.9 \approx 16$ bikes	3 pts to here
$x = \frac{-4700-1520}{-200} = 31.1 \approx 31$ bikes	4 pts to here (3 pts if no units)

16c. A company that manufactures bikes makes a daily profit, P, according to the equation $P(x) = -100x^2 + 4200x - 43371$ where P is measured in dollars and x is the number of mountain bikes made per day. Find the number of mountain bikes that must be made each day to produce a zero profit for the company. Round your answer to the nearest whole number.

$x = \frac{-4200 \pm \sqrt{(4200)^2 - 4(-100)(-43371)}}{2(-100)}$	1 pt to here
$x = \frac{-4200 \pm \sqrt{291600}}{-200}$	2 pts to here
$x = \frac{-4200+540}{-200} = 18.3 \approx 18$ bikes	3 pts to here
$x = \frac{-4200-540}{-200} = 23.7 \approx 24$ bikes	4 pts to here (3 pts if no units)

16d. A company that manufactures bikes makes a daily profit, P, according to the equation $P(x) = -100x^2 - 4500x - 48509$ where P is measured in dollars and x is the number of mountain bikes made per day. Find the number of mountain bikes that must be made each day to produce a zero profit for the company. Round your answer to the nearest whole number.

$x = \frac{-4500 \pm \sqrt{(4500)^2 - 4(-100)(-48509)}}{2(-100)}$	1 pt to here
$x = \frac{-4500 \pm \sqrt{846400}}{-200}$	2 pts to here
$x = \frac{-4500+920}{-200} = 17.9 \approx 18$ bikes	3 pts to here
$x = \frac{-4500-920}{-200} = 27.1 \approx 27$ bikes	4 pts to here (3 pts if no units)

16.5a. Salto Angel (waterfalls) in Venezuela have a height of 2648 feet. A pebble is thrown upward from the top of the falls with an initial velocity of 30 feet per second. The height of the pebble after t seconds is given by the equation $h = 16t^2 + 30t + 2648$. How long after the pebble is thrown will it be 1324 feet from the ground? Round to the nearest tenth of a second.

$1324 = -16t^2 + 30t + 2648$ or $0 = -16t^2 + 30t + 1324$	1 pt to here
$t = \frac{-30 \pm \sqrt{30^2 - 4(-16)(1324)}}{2(-16)}$	2 pt to here
$t = 10.08238$	3 pts to here
10.1 seconds	4 pts to here

16.5b. The Gullfoss (waterfalls) in Iceland have a height of 104 feet. A pebble is thrown upward from the top of the falls with an initial velocity of 25 feet per second. The height of the pebble after t seconds is given by the equation $h = 16t^2 + 25t + 104$. How long after the pebble is thrown will it be 52 feet from the ground? Round to the nearest tenth of a second.

$52 = -16t^2 + 25t + 104$ or $0 = -16t^2 + 25t + 52$	1 pt to here
$t = \frac{-25 \pm \sqrt{25^2 - 4(-16)(52)}}{2(-16)}$	2 pt to here
$t = 2.74602$	3 pts to here
2.7 seconds	4 pts to here

16.5c. The Wollombi Falls in Australia have a height of 1100 feet. A pebble is thrown upward from the top of the falls with an initial velocity of 30 feet per second. The height of the pebble after t seconds is given by the equation $h = 16t^2 + 30t + 1100$. How long after the pebble is thrown will it be 550 feet from the ground? Round to the nearest tenth of a second.

$550 = -16t^2 + 30t + 1100$ or $0 = -16t^2 + 30t + 550$	1 pt to here
$t = \frac{-30 \pm \sqrt{30^2 - 4(-16)(550)}}{2(-16)}$	2 pt to here
$t = 6.875$	3 pts to here
6.9 seconds	4 pts to here

16.5d. Victoria Falls in Zimbabwe have a height of 354 feet. A pebble is thrown upward from the top of the falls with an initial velocity of 40 feet per second. The height of the pebble after t seconds is given by the equation $h = 16t^2 + 40t + 354$. How long after the pebble is thrown will it be 177 feet from the ground? Round to the nearest tenth of a second.

$177 = -16t^2 + 40t + 354$ or $0 = -16t^2 + 40t + 177$	1 pt to here
$t = \frac{-40 \pm \sqrt{40^2 - 4(-16)(177)}}{2(-16)}$	2 pt to here
$t = 4.80316$	3 pts to here
4.8 seconds	4 pts to here

17a. A brace for a shelf has the shape of a right triangle. Its hypotenuse is 10 inches long and the two legs are equal in length. How long are the legs of the triangle? Keep answers in simplified radical form.

$x^2 + x^2 = 10^2$	1 pt to here
$x^2 = 50$	2 pts to here
$x = \sqrt{50}$ or $x = \pm\sqrt{50}$	3 pts to here
$x = 5\sqrt{2}$ in.	4 pts to here (3 pts no units)

17b. A monitor at Bulls-eye's electronics is listed as being 20 inches. This distance is the diagonal distance across the screen If the monitor has a square screen, what is the width of the screen? Keep answers in simplified radical form.

$x^2 + x^2 = 20^2$	1 pt to here
$x^2 = 200$	2 pts to here
$x = \sqrt{200}$ or $x = \pm\sqrt{200}$	3 pts to here
$x = 10\sqrt{2}$ in.	4 pts to here (3 pts no units)

17c. Tanya runs diagonally across a square field, from corner to corner. The total distance she ran was 40 yards. What is the length of each side of the square field? Keep answers in simplified radical form.

$x^2 + x^2 = 40^2$	1 pt to here
$x^2 = 800$	2 pts to here
$x = \sqrt{800}$ or $x = \pm\sqrt{800}$	3 pts to here
$x = 20\sqrt{2}$ yards	4 pts to here (3 pts no units)

17d. An 18-foot ladder is placed diagonally on a wall so that it forms an isosceles triangle with the wall and the ground. This means the distance from the wall to the bottom of the ladder is the same as the distance from the bottom of the wall to the top of the ladder. What is the distance from the wall to the bottom of the ladder? Keep answers in simplified radical form.

$x^2 + x^2 = 18^2$	1 pt to here
$x^2 = 162$	2 pts to here
$x = \sqrt{162}$ or $x = \pm\sqrt{338}$	3 pts to here
$x = 9\sqrt{2}$ feet.	4 pts to here (3 pts no units)

17.5a. A brace for a shelf has the shape of a right triangle. Its hypotenuse is 20 inches long and one of the legs is 14 inches long. How long is the other leg of the triangle? Keep answers in simplified radical form.

$x^2 + 14^2 = 20^2$	1 pt to here
$x^2 = 204$	2 pts to here
$x = \sqrt{204}$ or $x = \pm\sqrt{204}$	3 pts to here
$x = 2\sqrt{51}$ in.	4 pts to here (3 pts no units)

17.5b. A monitor at Bulls-eye's electronics is listed as being 30 inches. This distance is the diagonal distance across the screen If the monitor has a height of 25 inches, what is the width of the screen? Keep answers in simplified radical form.

$x^2 + 25^2 = 30^2$	1 pt to here
$x^2 = 275$	2 pts to here
$x = \sqrt{275}$ or $x = \pm\sqrt{275}$	3 pts to here
$x = 5\sqrt{11}$ in.	4 pts to here (3 pts no units)

17.5c. Tanya runs diagonally across a rectangular field, from corner to corner. The total distance she ran was 40 yards. If one side of the rectangular field is 24 yards, what is the length of the other side of the field? Keep answers in simplified radical form.

$24^2 + x^2 = 40^2$	1 pt to here
$x^2 = 224$	2 pts to here
$x = \sqrt{224}$ or $x = \pm\sqrt{224}$	3 pts to here
$x = 4\sqrt{14}$ yards	4 pts to here (3 pts no units)

17.5d. An 18-foot ladder is placed diagonally on a wall so that it forms a triangle with the wall and the ground. If the distance from the wall to the bottom of the ladder is 12 feet, how far above the ground does the ladder touch the wall? Keep answers in simplified radical form.

$12^2 + x^2 = 18^2$	1 pt to here
$x^2 = 180$	2 pts to here
$x = \sqrt{180}$ or $x = \pm\sqrt{180}$	3 pts to here
$x = 6\sqrt{5}$ feet.	4 pts to here (3 pts no units)

18a. Given $f(x) = x^2 - 6x + 5$. Identify the vertex, y-intercept, x-intercept(s), axis of symmetry. In order to receive full credit, you must show your work.

vertex $(3, -4)$	Add 2 pts
x-intercepts $(5, 0)$, $(1, 0)$	Add 2 pts for each
y-intercept $(0, 5)$	Add 1 pt
Axis of Symmetry $x = 3$	Add 1 pt

18b. Given $f(x) = x^2 - 4x + 3$. Identify the vertex, y-intercept, x-intercept(s), axis of symmetry. In order to receive full credit, you must show your work.

vertex $(2, -1)$	Add 2 pts
x-intercepts $(1, 0)$, $(3, 0)$	Add 2 pts for each
y-intercept $(0, 3)$	Add 1 pt
Axis of Symmetry $x = 2$	Add 1 pt

18c. Given $f(x) = x^2 - 2x - 3$. Identify the vertex, y-intercept, x-intercept(s), axis of symmetry. In order to receive full credit, you must show your work.

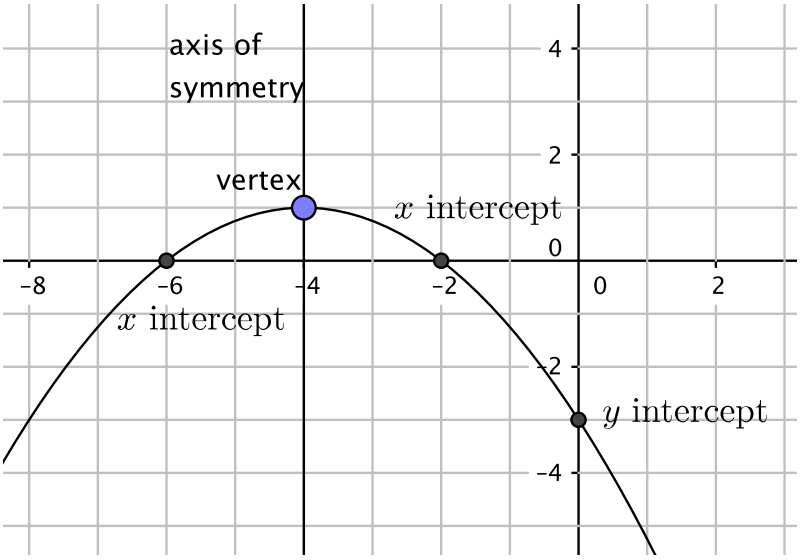
vertex $(1, -4)$	Add 2 pts
x-intercepts $(-1, 0)$, $(3, 0)$	Add 2 pts for each
y-intercept $(0, -3)$	Add 1 pt
Axis of Symmetry $x = 1$	Add 1 pt

18d. Given $f(x) = x^2 + 2x - 3$. Identify the vertex, y-intercept, x-intercept(s), axis of symmetry. In order to receive full credit, you must show your work.

vertex $(-1, -4)$	Add 2 pts
x-intercepts $(-3, 0)$, $(1, 0)$	Add 2 pts for each
y-intercept $(0, -3)$	Add 1 pt
Axis of Symmetry $x = -1$	Add 1 pt

18.5a. Graph the quadratic function with the characteristics below. Be sure to label the appropriate points on the graph.

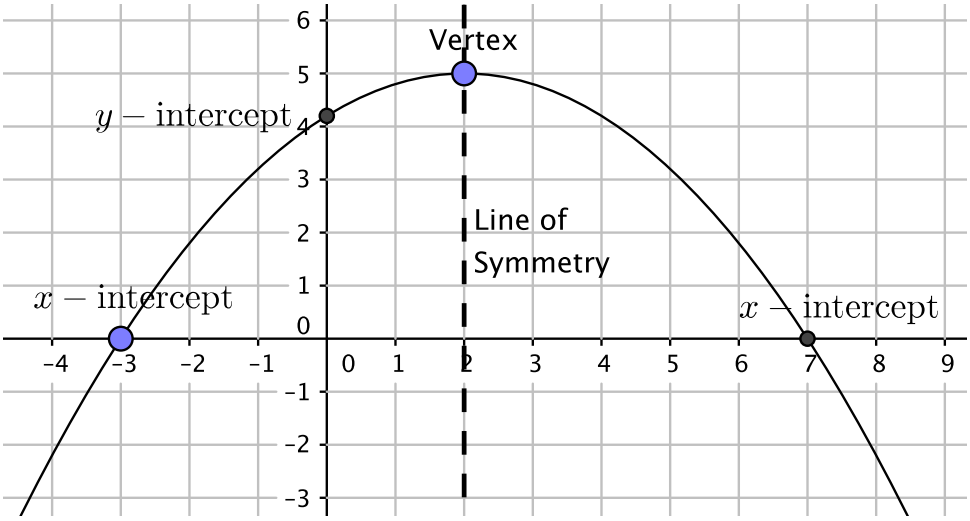
- Vertex: $(-4, 1)$
- y-intercept: $y = -3$
- x-intercepts: $x = -2, -6$
- Axis of symmetry: $x = -4$



Plot the vertex correct	1 point
Plot the x-intercepts	Add 2 pts
Plot the y-intercept	Add 1 pt
Have a concave down parabola	Add 2 pts
Label the points	Add 2 pts

18.5b. Graph the quadratic function with the characteristics below. Be sure to label the appropriate points on the graph.

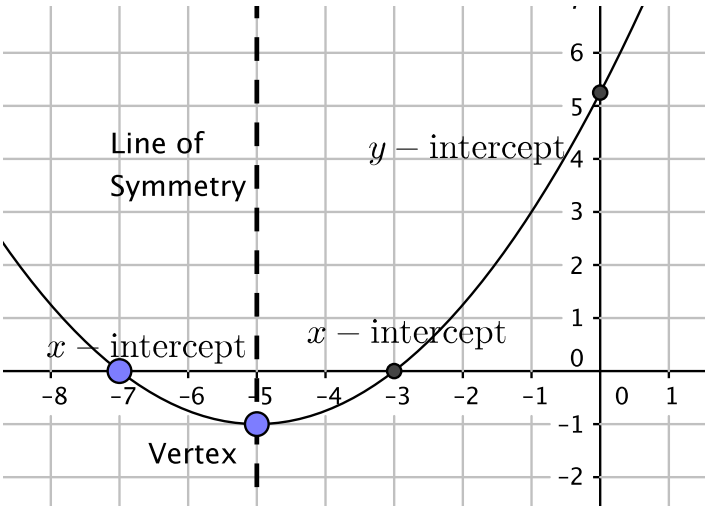
- Vertex: $(2, 5)$
- y-intercept: $y = 4.2$
- x-intercepts: $x = -3, -7$
- Axis of symmetry: $x = 2$



Plot the vertex correct	1 point
Plot the x-intercepts	Add 2 pts
Plot the y-intercept	Add 1 pt
Have a concave down parabola	Add 2 pts
Label the points	Add 2 pts

18.5c. Graph the quadratic function with the characteristics below. Be sure to label the appropriate points on the graph.

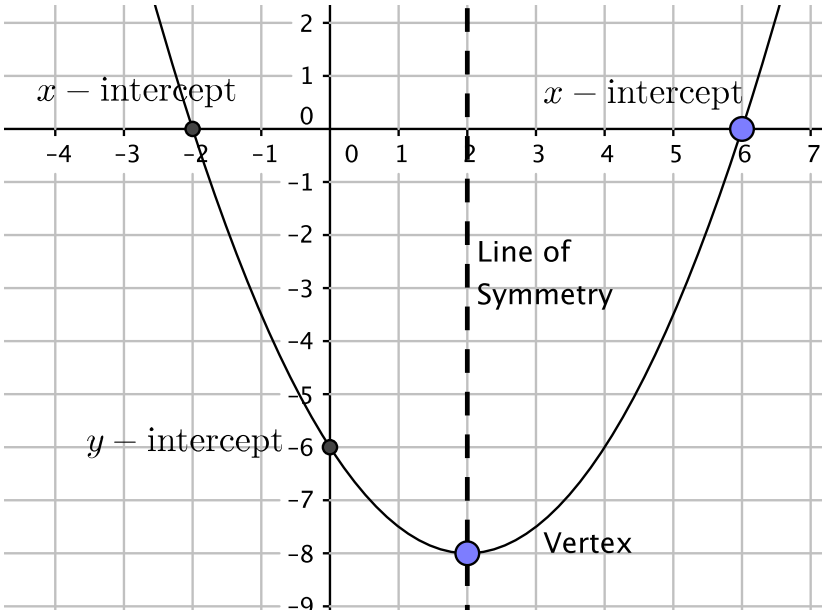
- Vertex: $(-5, -1)$
- y-intercept: $y = 5.25$
- x-intercepts: $x = -3, -75$
- Axis of symmetry: $x = -5$



Plot the vertex correct	1 point
Plot the x-intercepts	Add 2 pts
Plot the y-intercept	Add 1 pt
Have a concave down parabola	Add 2 pts
Label the points	Add 2 pts

18.5d. Graph the quadratic function with the characteristics below. Be sure to label the appropriate points on the graph.

- Vertex: $(2, -8)$ $y = .5(x+2)(x-6)$
- y-intercept: $y = -6$
- x-intercepts: $x = -2, 6$
- Axis of symmetry: $x = 2$



Plot the vertex correct	1 point
Plot the x-intercepts	Add 2 pts
Plot the y-intercept	Add 1 pt
Have a concave down parabola	Add 2 pts
Label the points	Add 2 pts

19a. Solve $|x+2| - 1 = 6$.

$\|x+2\| = 7$	1 pt
$x + 2 = 7$	
$x = 5$	2 pt
$x + 2 = -7$	3 pt to here
$x = -9$	4 pt to here

19b. Solve $|x+5|-3=10$.

$\|x+5\|=13$	1 pt
$x+5=13$	
$x=8$	2 pt
$x+5=-13$	3 pt to here
$x=-18$	4 pt to here

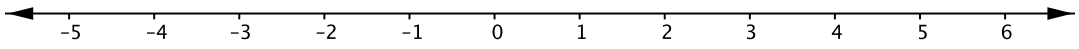
19c. Solve $|x-5|+4=12$.

$\|x-5\|=8$	1 pt
$x-5=8$	
$x=13$	2 pt
$x-5=-8$	3 pt to here
$x=-3$	4 pt to here

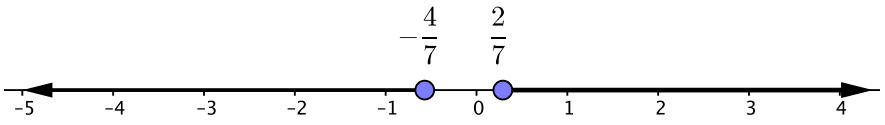
19d. Solve $|x-3|+2=13$.

$\|x-3\|=11$	1 pt
$x-3=11$	
$x=14$	2 pt
$x-3=-11$	3 pt to here
$x=-8$	4 pt to here

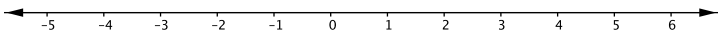
19.5a. Solve $|7x+1|\geq 3$ and graph the solution on the number line below.



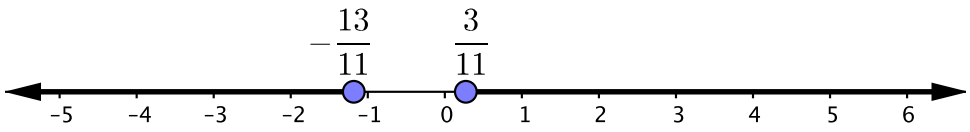
$7x+1\geq 3$ or $7x+1\leq -3$	2 pts
$x\geq \frac{2}{7}$ or $x\leq -\frac{4}{7}$	1 pt
Graphing the solution correctly	1 pt



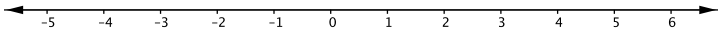
19.5b. Solve $|11x+5|\geq 8$ and graph the solution on the number line below.



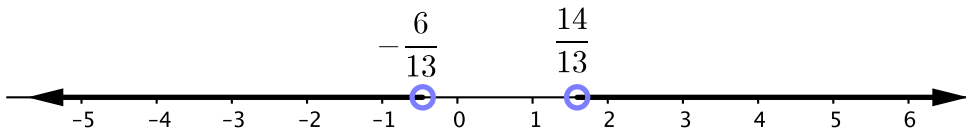
$11x + 5 \geq 8$ or $11x + 5 \leq -8$	2 pts
$x \geq \frac{3}{11}$ or $x \leq -\frac{13}{11}$	1 pt
Graphing the solution correctly	1 pt



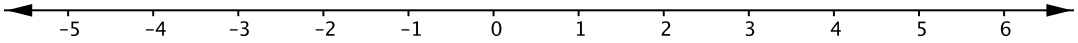
19.5c. Solve $|13x - 4| > 10$ and graph the solution on the number line below.



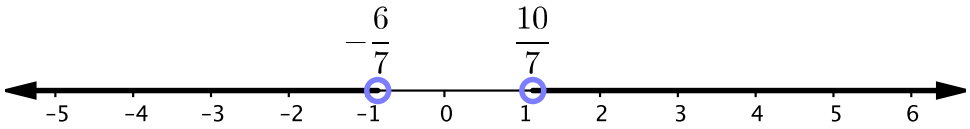
$13x - 4 > 10$ or $13x - 4 < -10$	2 pts
$x > \frac{14}{13}$ or $x < -\frac{6}{13}$	1 pt
Graphing the solution correctly	1 pt



19.5d. Solve $|7x - 2| > 8$ and graph the solution on the number line below.



$7x - 2 > 8$ or $7x - 2 < -8$	2 pts
$x > \frac{10}{7}$ or $x < -\frac{6}{7}$	1 pt
Graphing the solution correctly	1 pt



20a. Find the distance between $(3, -6)$ and $(-1, -9)$.

$d = \sqrt{(-1-3)^2 + (-9-(-6))^2}$	
$d = \sqrt{(-4)^2 + (-3)^2}$	1 pts to here
$d = \sqrt{16 + 9}$	2 pts to here
$d = \sqrt{25}$	3 pts to here
$d = 5$	4 pts to here

20b. Find the distance between $(1, -3)$ and $(-11, -8)$.

$d = \sqrt{(1-(-11))^2 + (-3-(-8))^2}$	
$d = \sqrt{(12)^2 + (5)^2}$	1 pts to here
$d = \sqrt{144 + 25}$	2 pts to here
$d = \sqrt{169}$	3 pts to here
$d = 13$	4 pts to here

20c. Find the distance between $(4, -5)$ and $(-2, -13)$.

$d = \sqrt{(4-(-2))^2 + (-5-(-13))^2}$	
$d = \sqrt{(6)^2 + (8)^2}$	1 pts to here
$d = \sqrt{36 + 64}$	2 pts to here
$d = \sqrt{100}$	3 pts to here
$d = 10$	4 pts to here

20d. Find the distance between $(-7, 13)$ and $(-12, 1)$.

$d = \sqrt{(-7-(-12))^2 + (13-1)^2}$	
$d = \sqrt{(5)^2 + (12)^2}$	1 pts to here
$d = \sqrt{25 + 144}$	2 pts to here
$d = \sqrt{169}$	3 pts to here
$d = 13$	4 pts to here

20.5a. Find the distance between $(3, 6)$ and $(8, 2)$.

$d = \sqrt{(8-3)^2 + (2-6)^2}$	1 pt to here
$d = \sqrt{(5)^2 + (-4)^2}$	2 pts to here
$d = \sqrt{25 + 16}$	3 pts to here
$d = \sqrt{41}$	4 pts to here

20.5b. Find the distance between $(1, 9)$ and $(4, 7)$.

$d = \sqrt{(4-1)^2 + (7-9)^2}$	1 pt to here
$d = \sqrt{(3)^2 + (-2)^2}$	2 pts to here
$d = \sqrt{9 + 4}$	3 pts to here
$d = \sqrt{13}$	4 pts to here

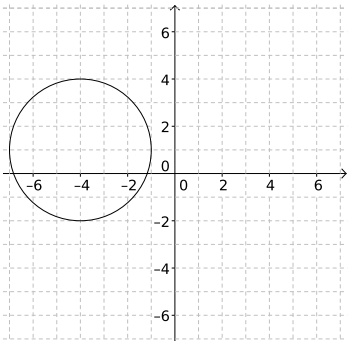
20.5c. Find the distance between $(4, 10)$ and $(1, 15)$.

$d = \sqrt{(1-4)^2 + (15-10)^2}$	1 pt to here
$d = \sqrt{(-3)^2 + (5)^2}$	2 pts to here
$d = \sqrt{9 + 25}$	3 pts to here
$d = \sqrt{34}$	4 pts to here

20.5d. Find the distance between $(7, 3)$ and $(1, 10)$.

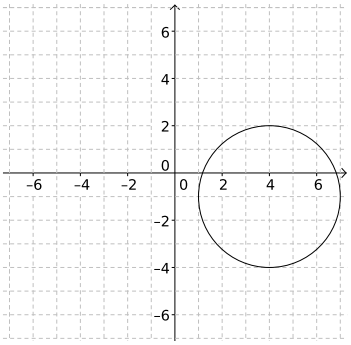
$d = \sqrt{(1-7)^2 + (10-3)^2}$	1 pt to here
$d = \sqrt{(-6)^2 + (7)^2}$	2 pts to here
$d = \sqrt{36 + 49}$	3 pts to here
$d = \sqrt{85}$	4 pts to here

21a. Find the center and radius, and graph the circle $(x+4)^2 + (y-1)^2 = 9$.



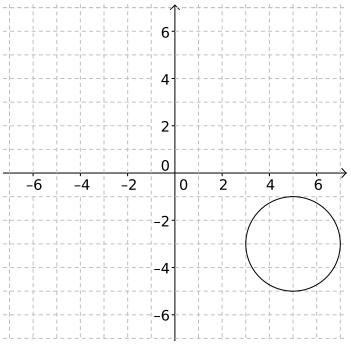
Correct graph	Add 2 points
Center $(-4, 1)$	Add 2 points
Radius 3	Add 2 points

21b. Find the center and radius, and graph the circle $(x-4)^2 + (y+1)^2 = 9$.



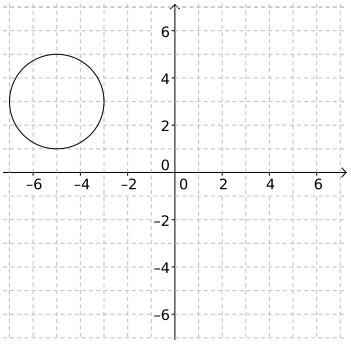
Correct graph	Add 2 points
Center $(4, -1)$	Add 2 points
Radius 3	Add 2 points

21c. Find the center and radius, and graph the circle $(x-5)^2 + (y+3)^2 = 4$.



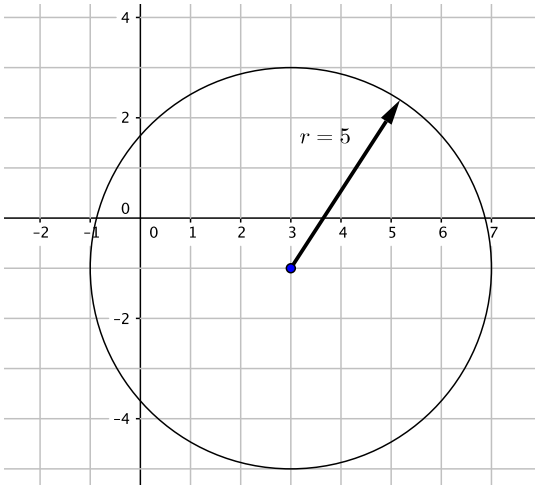
Correct graph	Add 2 points
Center $(5, -3)$	Add 2 points
Radius 2	Add 2 points

21d. Find the center and radius, and graph the circle $(x+5)^2 + (y-3)^2 = 4$.



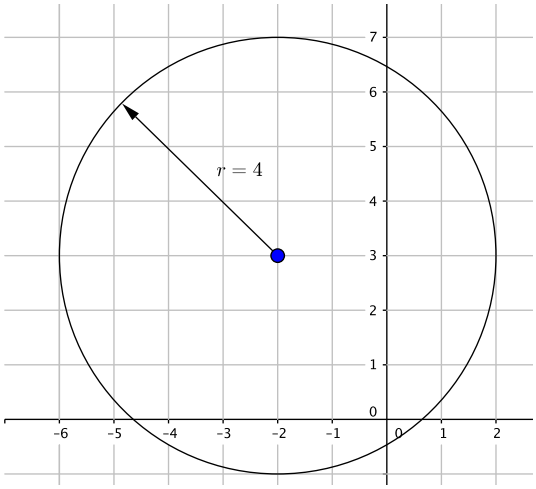
Correct graph	Add 2 points
Center $(-5, 3)$	Add 2 points
Radius 2	Add 2 points

21.5a. Find the equation of the circle graphed below.



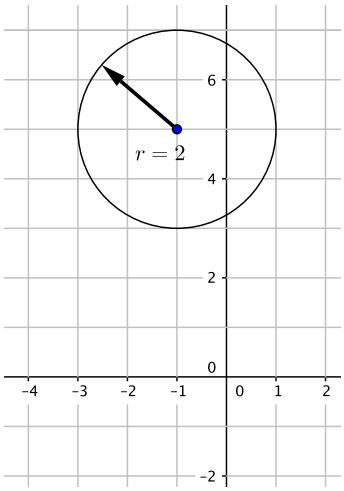
Correct form of the equations	$(x-h)^2+(y-k)^2=r^2$	Add 2 points
Correct center of the circle	$(3,-1)$	Add 2 points
Correct radius of the equation	$r=5$	Add 2 points

21.5b. Find the equation of the circle graphed below.



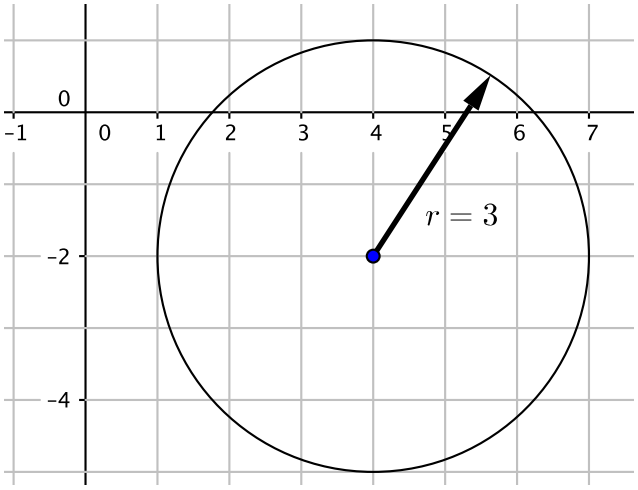
Correct form of the equations	$(x-h)^2+(y-k)^2=r^2$	Add 2 points
Correct center of the circle	$(-2,3)$	Add 2 points
Correct radius of the equation	$r=4$	Add 2 points

21.5c. Find the equation of the circle graphed below.



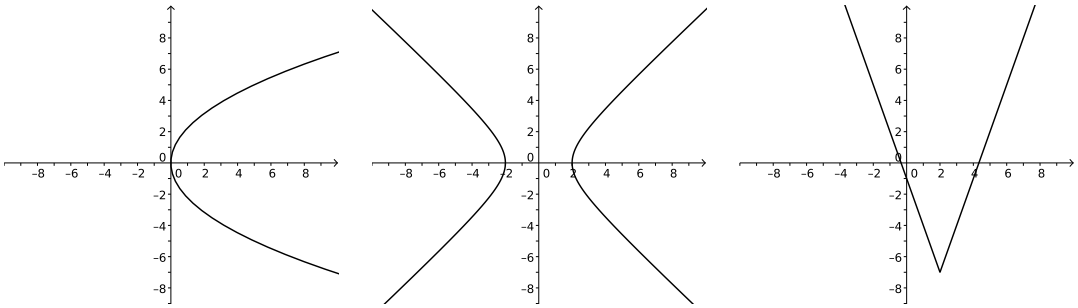
Correct form of the equations	$(x-h)^2+(y-k)^2=r^2$	Add 2 points
Correct center of the circle	$(-1,5)$	Add 2 points
Correct radius of the equation	$r=2$	Add 2 points

21.5d. Find the equation of the circle graphed below.



Correct form of the equations	$(x-h)^2+(y-k)^2=r^2$	Add 2 points
Correct center of the circle	$(4,-2)$	Add 2 points
Correct radius of the equation	$r=3$	Add 2 points

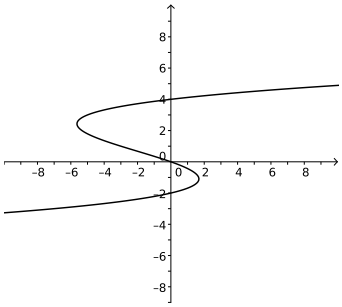
22a. Determine whether each graph represents a function.



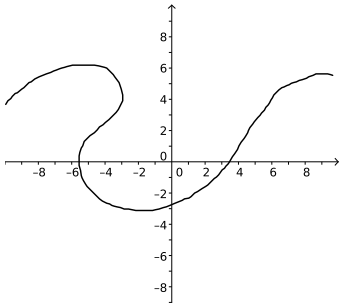
Yes or No Yes or No Yes or No

No (1 pt)	No (1 pt)	Yes (1 pt)
Add 1 point if all 3 correct		

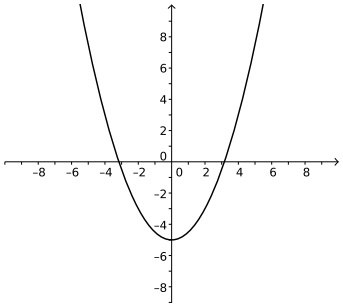
22b. Determine whether each graph represents a function.



Yes or No



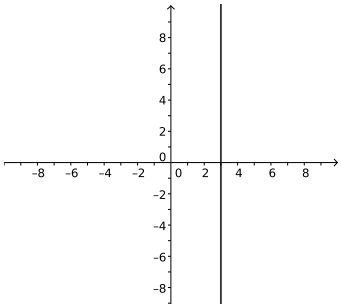
Yes or No



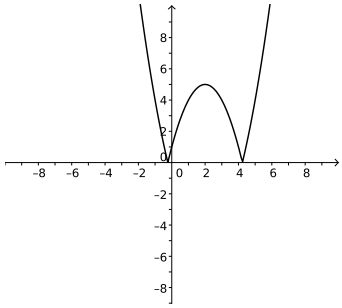
Yes or No

No (1 pt) No (1 pt) Yes (1 pt) Add 1 point if all 3 correct

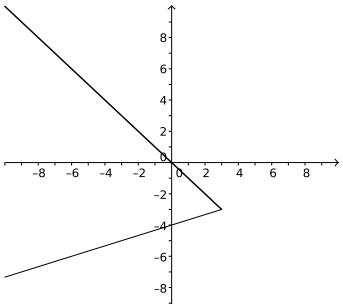
22c. Determine whether each graph represents a function.



Yes or No



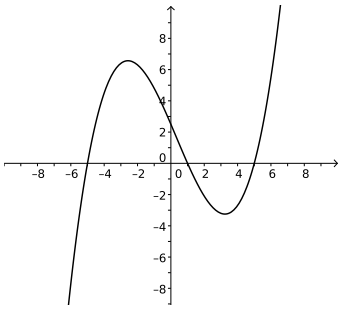
Yes or No



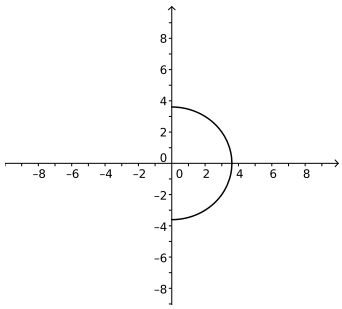
Yes or No

No (1 pt) Yes (1 pt) No (1 pt) Add 1 point if all 3 correct

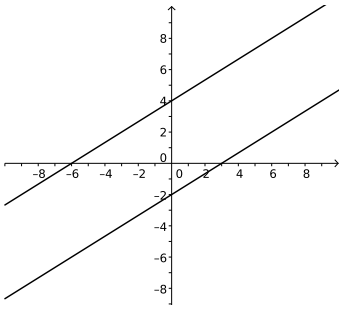
22d. Determine whether each graph represents a function.



Yes or No



Yes or No



Yes or No

Yes (1 pt) No (1 pt) No (1 pt) Add 1 point if all 3 correct

22.5a. Each table below contains some data pertaining to a function. Identify the domain and range for each.

(a) Wide Receivers on SCSU's Football Team:

Jersey Number	80	84	85	88
Weight (in lbs.)	200	193	200	207

(b) Towns in Connecticut:

Area Code	203	860	203
ZIP Code	06437	06117	06515

(a)	Domain: Jersey Number or $\{80, 84, 85, 88\}$	Add 1 point
	Range: Weight or $\{193, 200, 207\}$	Add 1 point
(b)	Domain: ZIP Code or $\{06437, 06117, 06515\}$	Add 1 point
	Range: Area Code or $\{203, 860\}$	Add 1 point

22.5b. Each table below contains some data pertaining to a function. Identify the domain and range for each.

(a) Players on SCSU's Men's Basketball Team:

Height (in inches)	73	79	72	79
Jersey Number	3	15	31	32

(b) Profit from Selling Pizza:

Number of Pizzas Sold in a Day	100	120	130	90
Profit (in dollars)	800	900	900	600

(a)	Domain: Jersey Number or $\{3, 15, 31, 32\}$	Add 1 point
	Range: Height or $\{72, 73, 79\}$	Add 1 point
(b)	Domain: Pizzas Sold or $\{90, 100, 120, 130\}$	Add 1 point
	Range: Profit (in dollars) or $\{600, 800, 900\}$	Add 1 point

22.5c. Each table below contains some data pertaining to a function. Identify the domain and range for each.

(a) Players on SCSU's Women's Basketball Team:

Jersey Number	5	10	15	23
Height (in inches)	70	64	70	72

(b) Profit from Selling Coal:

Profit (in thousands of dollars)	109	480	505	109
Tons of Coal Sold	500	100	1500	2500

(a)	Domain: Jersey Number or $\{5, 10, 15, 23\}$	Add 1 point
	Range: Height or $\{64, 70, 72\}$	Add 1 point
(b)	Domain: Tons of Coal Sold or $\{500, 1000, 1500, 2500\}$	Add 1 point
	Range: Profit (in thousands of dollars) or $\{109, 480, 505\}$	Add 1 point

22.5d. Each table below contains some data pertaining to a function. Identify the domain and range for each.

(a) Players on SCSU's Women's Soccer Team:

Jersey Number	1	8	9	16
Birth Year	1997	1998	1996	1997

(b) Weight of a Person Each Monday in May:

Weight (in pounds)	162	160	162	158
Week Number	1	2	3	4

(a)	Domain: Jersey Number or $\{1, 8, 9, 16\}$	Add 1 point
	Range: Birth Year or $\{1996, 1997, 1998\}$	Add 1 point
(b)	Domain: Week Number or $\{1, 2, 3, 4\}$	Add 1 point
	Range: Weight or $\{158, 160, 162\}$	Add 1 point

23a. Let $C(w) = \frac{1}{5}w - 3$. Find a.) $C(7)$ and b.) $C(a+1)$. Be sure to simplify your answers.

$C(7) = -1.6$	2 pts
$C(a+1) = \frac{1}{5}(a+1) - 3$	1 additional point
$C(a+1) = \frac{1}{5}a - \frac{14}{5}$	1 additional point

23b. Let $C(w) = \frac{1}{4}w - 5$. Find a.) $C(6)$ and b.) $C(a-1)$. Be sure to simplify your answers.

$C(6) = -3.5$	2 pts
$C(a-1) = \frac{1}{4}(a-1) - 5$	1 additional point
$C(a-1) = \frac{1}{4}a - \frac{21}{4}$	1 additional point

23c. Let $C(w) = \frac{1}{2}w - 6$. Find a.) $C(10)$ and b.) $C(a+3)$. Be sure to simplify your answers.

$C(10) = -1$	2 pts
$C(a+3) = \frac{1}{2}(a+3) - 6$	1 additional point
$C(a+3) = \frac{1}{2}a - \frac{9}{2}$	1 additional point

23d. Let $C(w) = \frac{1}{5}w - 7$. Find a.) $C(4)$ and b.) $C(a-2)$. Be sure to simplify your answers.

$C(4) = -6.2$	2 pts
$C(a-2) = \frac{1}{5}(a-2) - 7$	1 additional point
$C(a-2) = \frac{1}{5}a - \frac{37}{5}$	1 additional point

23.5a. Let $h(t) = 3t^2 - 9t + 2$. Find $h(3)$ and $h(-2)$. Be sure to simplify your answers.

$h(3) = 2$	2 pts
$h(-2) = 3(-2)^2 - 9(-2) + 2$	1 additional point
$h(-2) = 32$	1 additional point

23.5b. Let $h(t) = 2t^2 - 8t - 1$. Find $h(2)$ and $h(-3)$. Be sure to simplify your answers.

$h(2) = -9$	2 pts
$h(-3) = 2(-3)^2 - 8(-3) - 1$	1 additional point
$h(-3) = 35$	1 additional point

23.5c. Let $h(t) = 4t^2 - 2t + 5$. Find $h(4)$ and $h(-1)$. Be sure to simplify your answers.

$h(3) = 61$	2 pts
$h(-1) = 4(-1)^2 - 2(-1) + 5$	1 additional point
$h(-1) = 11$	1 additional point

23.5d. Let $h(t) = 3t^2 - 6t + 4$. Find $h(5)$ and $h(-2)$. Be sure to simplify your answers.

$h(5) = 44$	2 pts
$h(-2) = 3(-2)^2 - 6(-2) + 4$	1 additional point
$h(-2) = 28$	1 additional point