Date: _____ Name: _____

Review of Grade 9-11 Math

Lines & Factoring

1. Find an equation for a line
   a) with slope 6 passing through (–1, 4)
   b) that passes through (–5, 0) and (5, 6)
2. A line is perpendicular to $5x + 2y - 8 = 0$ and has the same y-intercept as $x + 4y - 12 = 0$. Find an equation for the line.
3. Factor fully, if possible

a. $4y^2 + y + 16$
b. $-5t^2 + 15t - 10$
c. $20a^2 - 5$
d. $144m^2 - 49n^2$
e. $30x^2 - 25xy - 30y^2$
f. $16x^3y - 4x^2y^2 + 20x^4y^3$
g. $5xy - 10x + 7zy - 14z$
h. $x^2 - 10x + 16$
i. $9x^2 - 24x + 16$

Rational Expressions

4. Simplify and state the restrictions

a. $\frac{36x^2y}{-16xy^2}$
b. $\frac{9m^2-4}{9m^2-9m-10}$
c. $\frac{5x^2+15x}{x^2-2x-15} \times \frac{x^2-7x+10}{10x-20}$
d. $\frac{2x^2-x-3}{x^2-1} \div \frac{2x^2+x-6}{x^2+x-2}$
e. $\frac{1}{y+4} - \frac{y-3}{y^2+3y-4}$

Quadratics

5. State the equation for the arc in all three forms (factored/vertex/standard), given that the parabolic arc's legs are at 2m away and at 6 m away, and the arc's maximum height is 10m.
6. What is the maximum area that can be enclosed by 200m of fencing?
7. Determine two numbers whose difference is 12 and whose product is a minimum.
8. A bus company has 4000 passengers daily, each paying a fare of $2. For each $0.15 increase, the company estimates that it will lose 40 passengers per day. If the company needs to take in $10450 per day to stay in business, what fare should be charged?
9. Jackie mows a strip of uniform width around her 25m by 15m rectangular lawn and leaves a patch of lawn that is 60% of the original area. What is the width of the strip?
10. A daredevil jumps off the CN Tower and falls freely for several seconds before releasing his parachute. His height, h, in meters, t seconds after jumping is given by $h = -4.9t^2 + t + 360$ before he released his parachute; and $h = -4t + 142$ after he released his parachute. How long after jumping did he daredevil release his parachute? How high was the jumper at this time?

Trigonometry

11. Determine the exact value of the expressions
    a. $2cos45^o \times sin315^o$
    b. $tan^2 30^o - cos^2 225^o$
    c. $\sin 30^o \times \tan 60^o - \cos 210^o$
12. Solve the equations in degrees on the domain of $0^o \le \theta \le 360^o$,
    a. $\sin\theta - 2\sin^2\theta = 0$
    b. $2sin^2\theta - 1 = sin\theta$
    c. $2\cos^2\theta - 3\cos\theta - 2 = 0$
13. Prove the identities
    a. $\sec\theta \csc\theta = \tan\theta + \cot\theta$
    b. $\frac{\tan x}{\cos x} = \frac{\sin x}{1-sin^2 x}$

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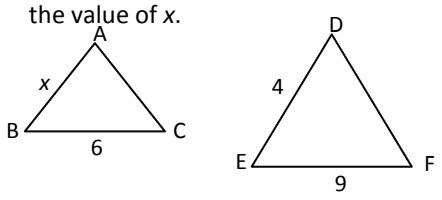
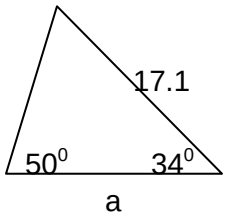
14. On a merry-go-round, each horse moves up and down in a periodic motion modelled by the function: $h = 0.5\cos\frac{180^o}{15}t + 1$, where *h* is the height in meters from the ground and t is the time in seconds.
    a. What is the period of this function and what does it mean in the context of this problem?
    b. What are the maximum and minimum heights of the merry-go-round horse?
    c. What is height of the horse at 30 seconds?
    d. At what two times will the horse be at a height of 1.25 m from the ground?
15. Write the trig equations Sine and Cosine for the function with a period of 5, a low point of – 3 at x=1 and an amplitude of 7.
16. Given $\Delta ABC \sim \Delta DEF$, determine the value of *x*.



17. Find the value of each indicated variable {to one decimal place}

a)



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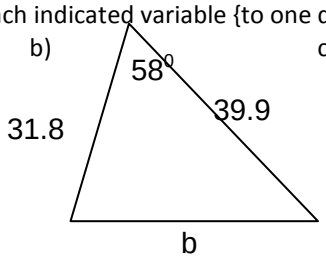
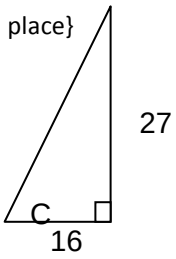


c)



18. Teresa is at the top of her apartment building and is looking down at her friend Karin at a 50° angle of depression. The horizontal distance from the base of the building to Karin is 16 m. Determine the vertical height of the building.

Exponentials

19. Simplify
    a. $\left(\sqrt[9]{512}\right)^5$
    b. $\left(\frac{-32}{243}\right)^{-\frac{2}{5}}$
    c. $\left(\sqrt{5}x^{\frac{1}{3}}\right)^6$
    d. $(32a^{10})^{\frac{2}{5}}$
    e. $\left(\sqrt[2]{27^{\frac{2}{9}}}\right)^3$
    f. $[(3x-1)^6]^{\frac{1}{3}}$
    g. $\frac{48\left(\sqrt[3]{a^4}\right)b^{\frac{2}{5}}}{16a^{-\frac{1}{3}}\left(\sqrt[5]{b^7}\right)}$
20. On January 1, 1997 the population of a city was 500 000. If the population increases at a rate of 1.5% per year, what will the population be on July 1, 2002
21. A ball fell from a shelf 200cm above the ground. Its height decreases 60% with each bounce. What is the balls height after 3 bounces?
22. A certain bacteria culture triples every 50 minutes. How long will it take 25 bacteria to reach a count of 1000?

Inverses & Transformations

$f(x) = \frac{1}{x}$ $g(x) = x^3$ $h(x) = \sqrt{x}$ $i(x) = \sqrt[3]{x}$ $j(x) = |x|$ $k(x) = x^2$

23. For **three** of the functions above rewrite the equation to include the following transformations : horizontally stretched by 2, vertically stretched by 4, reflected in y-axis, shifted left by 3, shifted up by 6
24. For **three OTHER** of the functions above sketch the new transformed function if it is: reflected in the x-axis, vertically compressed by 2, shifted up 5
25. For each function above sketch its inverse.
26. Find the inverse equation for $f(x) = x^2 - 6x + 4$
27. Find the inverse equation for question 14.
28. $f(x) = \frac{x}{x^2-1}$, what is $f\left(\frac{1}{x}\right)$?

Other Topics

29. Expand using Binomial Theorem/Pascal's Triangle $(x-2)^6$
30. Simplify, rationalize denominators when needed.
    a. $\sqrt{100-36}$
    b. $\sqrt{45}$
    c. $\frac{3\sqrt{5}\times 8\sqrt{7}}{16\sqrt{10}}$
    d. $9\sqrt{8} - 5\sqrt{40} + 4\sqrt{18} - \sqrt{160}$
    e. $(\sqrt{6} - 3\sqrt{7})^2$
    f. $\frac{\sqrt{2}}{\sqrt{8}-\sqrt{2}}$
31. Solve
    a. $\frac{x}{2} - \frac{1}{7}(x+1) = \frac{1}{3}(2x-6)$
    b. $\frac{x+3}{x-5} = \frac{x-6}{x-8}$
    c. $2x + \sqrt{3x-2} = x+4$
    d. $\sqrt{2x-1} + \sqrt{x+11} = 7$
    e. $6(2-x) \le -4(x+2)$
    f. $6m^2 + 3(m^2+1) > (3m+1)^2 + 2$

ansPRACTICEreview

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1(a) $y = mx + b$
$4 = 6(-1) + b$
$4 = -6 + b$
$10 = b$
$\therefore y = 6x + 10$

(b) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-0}{5-(-5)} = \frac{6}{10} = \frac{3}{5}$
$6 = \frac{3}{5}(5) + b$
$6 = 3 + b$
$3 = b$ $\therefore y = \frac{3}{5}x + 3$

2.) $5x + 2y - 8 = 0$
$2y = -5x + 8$
$y = -\frac{5}{2}x + 4$
$\therefore m = -\frac{5}{2}$ $m_{\perp} = \frac{2}{5}$

$x + 4y - 12 = 0$
$4y = -x + 12$
$y = -\frac{1}{4}x + 3$
$b = 3$
$\therefore y = \frac{2}{5}x + 3$

3(a) 4y 2y / y 2y 16 1 8 2 4 / 1 16 2 8 4
not possible

(b) $-5(t^2 - 3t + 2)$ (t, t × −2, −1; adds to −3t)
$-5(t-2)(t-1)$

(c) $5(4a^2 - 1)$ (2a, 2a × 1, −1; adds to zero)
$5(2a+1)(2a-1)$

(d) $144m^2 - 49n^2$ (12m, 12m × 7n, −7n; adds to zero)
$(12m+7n)(12-7n)$

(e) $5(6x^2 - 5xy - 6y^2)$ (6x, x / 3x, 2x × 6y, y / y, 6y / 3y, 2y / 2y, −3y; adds to −5xy)
$5(3x+2y)(2x-3y)$

(f) $4x^2y(4x - y + 5x^2y^2)$
not possible since pattern of variables is wrong

(g) $5x(y-2) + 7z(y-2)$
$(y-2)(5x+7z)$

(h) $(x-8)(x-2)$

(i) $3x, 3x \times -4, -4$ (adds to $-24x$)
$(3x-4)^2$

4(a) $\frac{(4)(9)(x)(x)(y)}{(-4)(4)(x)(y)(y)} = \frac{9x}{-4y}$ $x \neq 0$, $y \neq 0$

(b) $\frac{(3m+2)(3m-2)}{(3m-5)(3m+2)} = \frac{3m-2}{3m-5}$ $m \neq \frac{5}{3}, -\frac{2}{3}$ (3m, 3m × −5, 2; 10, 1)

(c) $\frac{8x(x+3)}{(x-5)(x+3)} \cdot \frac{(x-5)(x-2)}{2(8)(x-2)} = \frac{x}{2}$ $x \neq 5, -3, 2$

(d) $\frac{(2x-3)(x+1)}{(x+1)(x-1)} \div \frac{(2x-3)(x+2)}{(x+2)(x-1)}$ $x \neq -1, 1, -2, \frac{3}{2}$
$= \frac{(2x-3)(x+1)}{(x+1)(x-1)} \cdot \frac{(x+2)(x-1)}{(2x-3)(x+2)} = 1$

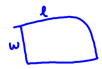
(e) $\frac{(y-1)\,1}{(y-1)(y+4)} - \frac{(y-3)}{(y+4)(y-1)}$
$= \frac{[y-1-(y-3)]}{(y-1)(y+4)}$
$= \frac{y-1-y+3}{(y-1)(y+4)}$
$= \frac{2}{(y-1)(y+4)}$ $y \neq -4, 1$

5.) 

$\frac{2+6}{2} = \frac{8}{2} = 4$
$\therefore$ vertex $(4, 10)$

$y = a(x-r)(x-t)$
$10 = a(4-2)(4-6)$
$10 = a(2)(-2)$
$-\frac{10}{4} = a$
$-\frac{5}{2} = a$

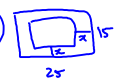
$\therefore y = -\frac{5}{2}(x-2)(x-6)$
$y = -\frac{5}{2}(x-4)^2 + 10$
$y = -\frac{5}{2}(x^2 - 8x + 12)$

6.) 

$2l + 2w = 200$
$l = 100 - w$
$\therefore$ Area ~~is~~ 2500 m^2
$A = (100-w)w$
max at vertex
zeros 0 and 100
$\frac{0+100}{2} = 50$
$A = (100-50)(50)$
$A = 2500$
$\therefore$ vertex $(50, 2500)$ (w, A)

7.) $x - y = 12$ sub
Product $= xy$
$P = (12+y)y$
MIN at vertex
$P = y^2 + 12y$
$\left(\frac{b}{2}\right)^2 = 36$
$P = y^2 + 12y + 36 - 36$
$P = (y+6)^2 - 36$
$\therefore$ vertex $(-6, -36)$ (y, P)
the two numbers are −6 and 6

8.) Rev = (price)(quantity)
$R = (2 + 0.15x)(4000 - 40x)$
$10450 = 8000 - 80x + 600x - 6x^2$
$0 = -6x^2 + 520x - 2450$
$x = \frac{-520 \pm \sqrt{520^2 - 4(-6)(-2450)}}{2(-6)}$
$x = \frac{-520 \pm 460}{-12} \rightarrow 5$ or 81.7
$\therefore$ price $= 2 + 0.15x$
$= 2 + 0.15(5)$
$= \$2.75$
or $2 + 0.15(81.7)$
$= \$14.26$
should be charged

9.) 

$A_{TOTAL} = 25 \times 15 = 375$
$A_{left} = 60\%$ of $375 = 225$
$A_{left} = (25-2x)(15-2x)$
$225 = 375 - 50x - 30x + 4x^2$
$0 = 4x^2 - 80x + 150$
$x = \frac{+80 \pm \sqrt{80^2 - 4(4)(150)}}{2(4)}$
$x = \frac{80 \pm 63.2}{8} \rightarrow 17.9$ or 2.1
if $x = 17.9$
$l = 15 - 2x = 15 - 2(17.9)$ is negative!
$\therefore x = 2.1$ m wide

10.) $h = -4.9t^2 + t + 360$ sub
$h = -4t + 142$
$-4.9t^2 + t + 360 = -4t + 142$
$-4.9t^2 + 5t + 218 = 0$
$t = \frac{-5 \pm \sqrt{5^2 - 4(-4.9)(218)}}{2(-4.9)}$
$t = \frac{-5 \pm 65.6}{-9.8} \rightarrow$ ~~−6.2~~ or 7.2

$\therefore$ parachute released at 7.2 sec and height
$h = -4(7.2) + 142$
$= 113.2$ meters

(11) Triangle 1, 1, $\sqrt{2}$, 45°; triangle $\sqrt{3}$, 1, 2, 30°, 60°

ⓐ $2\left(\frac{1}{\sqrt{2}}\right)\left(-\frac{1}{\sqrt{2}}\right)$
$= 2\left(\frac{-1}{\sqrt{4}}\right) = \frac{-2}{2} = -1$

sine is neg in IV
cos is neg in III

ⓑ $\left(\frac{1}{\sqrt{3}}\right)^2 - \left(-\frac{1}{\sqrt{2}}\right)^2$
$= \frac{1}{\sqrt{9}} - \left(\frac{1}{\sqrt{4}}\right)$
$= \frac{1}{3} - \frac{1}{2}$
$= \frac{2-3}{6} = -\frac{1}{6}$

ⓒ $\left(\frac{1}{2}\right)\left(\frac{\sqrt{3}}{1}\right) - \left(-\frac{\sqrt{3}}{2}\right)$
$= \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2}$
$= \frac{2\sqrt{3}}{2} = \sqrt{3}$

(12) ⓐ $\sin\theta(1-2\sin\theta)=0$
$\sin\theta = 0$ or $1-2\sin\theta=0$
$\frac{1}{2}=\sin\theta$
$\theta_1=0°$, $\theta_2=360°$, $\theta_3=180°$
$\theta_4=30°$, $\theta_5=150°$

ⓑ $2\sin^2\theta - \sin\theta - 1 = 0$
$(2\sin\theta+1)(\sin\theta-1)=0$
$\sin\theta=-\frac{1}{2}$ or $\sin\theta=1$
$\theta_1=210°$, $\theta_2=330°$, $\theta_3=90°$

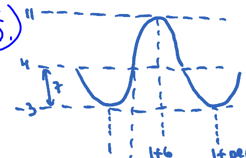
ⓒ $(2\cos\theta+1)(\cos\theta-2)=0$
$\cos\theta=-\frac{1}{2}$ $\cos\theta=2$
$\theta_1=120°$, $\theta_2=240°$, $\theta=N/A$

13ⓐ $\frac{1}{\cos\theta}\cdot\frac{1}{\sin\theta}$ | $\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}$ (LCD)
$\frac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta}$ (P.I.)
$\frac{1}{\sin\theta\cos\theta}$

ⓑ $\frac{\sin x}{\cos x}\div\cos x$ | $\frac{\sin x}{1-\sin^2 x}$
$\frac{\sin x}{\cos x}\times\frac{1}{\cos x}$ | $\frac{\sin x}{\cos^2 x}$ (P.I.)
$\frac{\sin x}{\cos^2 x}$

14 ⓐ $(\pi = 180°)$ $p=\frac{360°}{k} = 360°\div\frac{180°}{15} = 360°\div 12° = 30$
ⓑ MAX $= w+|a| = 1+0.5 = 1.5$ MIN $= w-|a| = 1-0.5 = 0.5$
ⓒ $h = 0.5\cos[12°(30)]+1 = 1.5$
ⓓ $1.25 = 0.5\cos[12°t]+1$
$\frac{0.25}{0.5} = \cos[12t]$
$0.5 = \cos(12°t)$
$\theta_1 = 60° = 12°t \rightarrow t = 5$ sec
$\theta_2 = 300° = 12°t \rightarrow t = 25$ sec

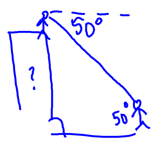
(15)



$\frac{1+6}{2} = 3.5$
$\frac{1+3.5}{2} = 2.25$
1 period $= 6$
$y = 7\sin\left[\frac{360°}{5}(x-2.25)\right]+4$
$y = 7\cos\left[\frac{360°}{5}(x-3.5)\right]+$

(16) $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
$\frac{x}{4} = \frac{6}{9}$ $\therefore x = \frac{8}{3}$

(18)



$\tan 50° = \frac{x}{16}$
19.1 m is the height of the building.

(19) ⓐ $2^5 = 32$
ⓑ $\left(\frac{243}{-32}\right)^{2/5} = \left(\sqrt[5]{\frac{243}{-32}}\right)^2 = \left(\frac{3}{-2}\right)^2 = \frac{9}{4}$
ⓒ $\left(5^{1/2}x^{1/3}\right)^6 = 5^3x^2 = 125x^2$
ⓓ $\left(\sqrt[5]{32}\right)^2 a^4 = 2^2a^4 = 4a^4$
ⓔ $\left(27^{2/9}\right)^{3/2} = 27^{1/3} = \sqrt[3]{27} = 3$
ⓕ $(3x-1)^2 = 9x^2-6x+1$
ⓖ $\frac{48a^{4/3}b^{2/5}}{16a^{-1/3}b^{7/5}} = 3a^{4/3--1/3}b^{2/5-7/5}$
$= 3a^{5/3}b^{-1} = \frac{3a^{5/3}}{b}$

(17) ⓐ $\angle A = 180° - 50° - 34° = 96$
$\frac{\sin 96}{a} = \frac{\sin 50}{17.1}$
$a = 22.2$
ⓑ $b^2 = 31.8^2 + 39.9^2 - 2(31.8)(39.9)\cos 58$
$b = 35.5$
ⓒ $\tan C = \frac{27}{16}$
$C = 59.3°$

(22) A = 25
B = 3 triples
C = 50 minutes
y = 1000 bacteria
$1000 = 25(3)^{x/50}$
$40 = 3^{x/50}$
$\log 40 = (\log 3)\frac{x}{50}$
$50\left(\frac{\log 40}{\log 3}\right) = x$
168 minutes $= x$ or 2.8 hrs.

(20) $y = A(B)^{x/c}$
A = 500 000
B = 1 + 0.015
C = 1 year
$y = 500000(1.015)^{x/1}$
Jan 97 to July 02
x = 5.5 years
$y = 500000(1.015)^{5.5}$
y = 542 667 people

(21) A = 200
B = 1 − 0.60 = 0.4
C = 1 bounce
X = 3 bounces
$y = 200(0.4)^{3/1}$
y = 12.8 cm

(23) $f \to \frac{4}{-0.5(x+3)} + 6$

$g(\text{and}) \to 4\left(-0.5(x+3)\right)^3 + 6$

$h(\text{and}) \to 4\sqrt{-0.5(x+3)} + 6$

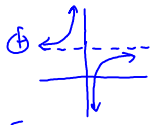
$j \to 4\left|-0.5(x+3)\right| + 6$

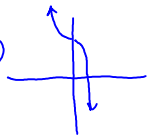
(24) $f \to \frac{-2}{x} + 5$

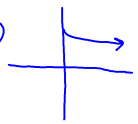
$g(\text{and}) \to -2x^3 + 5$

$h(\text{and}) \to -2\sqrt{x} + 5$

$j \to -2|x| + 5$

(f) 

(g) 

(h) 

(i) 

(j) 

(25) $f = \frac{1}{x}$ $f^{-1} = \frac{1}{x}$ 

$g = x^3$ $g^{-1} = \sqrt[3]{x}$ 

$h = \sqrt{x}$ $h^{-1} = x^2$ 

$i = \sqrt[3]{x}$ $i^{-1} = x^3$ 

$j = |x|$ $j^{-1} = \begin{cases} x & \text{if } y \geq 0 \\ -x & y < 0 \end{cases}$ 

$k = x^2$ $k^{-1} = \begin{cases} \sqrt{x} \\ -\sqrt{x} \end{cases}$ 

(26) $y = x^2 - 6x + 4$

$y = x^2 - 6x + 9 - 9 + 4$

$y = (x-3)^2 - 5$

$y + 5 = (x-3)^2$

$\pm\sqrt{y+5} = x - 3$

$\pm\sqrt{y+5} + 3 = x$

$\pm\sqrt{x+5} + 3 = f^{-1}(x)$

(27) $h = 0.5\cos\frac{180}{15}t + 1$

$h - 1 = 0.5\cos 12t$

$\frac{h-1}{0.5} = \cos 12^\circ t$

$\cos^{-1}\left(\frac{h-1}{0.5}\right) = 12t$

$\frac{\cos^{-1}\left(\frac{h-1}{0.5}\right)}{12^\circ} = t = t(h) = h^{-1}(h)$

(28) $f\left(\frac{1}{x}\right) = \frac{\frac{1}{x}}{\left(\frac{1}{x}\right)^2 - 1}$

$= \frac{1}{x} \div \left[\frac{1 - x^2}{x^2}\right]$

$= \frac{1}{x} \times \frac{x^2}{1 - x^2}$

$= \frac{x}{1 - x^2}$

(29) $(x-2)^6 = 1(x^6)(-2)^0 + 6(x^5)(-2)^1 + 15(x^4)(-2)^2 + 20(x^3)(-2)^3 + 15(x^2)(-2)^4 + 6(x^1)(-2)^5 + 1(x^0)(-2)^6$

$= x^6 + 6(-2)x^5 + 15(4)x^4 + 20(-8)x^3 + 15(16)x^2 + 6(-32)x + 64$

$= x^6 - 12x^5 + 60x^4 - 160x^3 + 240x^2 - 192x + 64$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1

(30) (a) $\sqrt{64} = 8$

(b) $\sqrt{9}\sqrt{5} = 3\sqrt{5}$

(c) $\frac{24\sqrt{35}}{16\sqrt{10}} = \frac{3\sqrt{7}}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{14}}{4}$

(d) $9\sqrt{4}\sqrt{2} - 5\sqrt{4}\sqrt{10} + 4\sqrt{9}\sqrt{2} - \sqrt{16}\sqrt{10}$

$= 18\sqrt{2} - 10\sqrt{10} + 12\sqrt{2} - 4\sqrt{10}$

$= 30\sqrt{2} - 14\sqrt{10}$

(e) $(\sqrt{6} - 3\sqrt{7})(\sqrt{6} - 3\sqrt{7})$

$= \sqrt{36} - 3\sqrt{42} - 3\sqrt{42} + 9\sqrt{49}$

$= 6 - 6\sqrt{42} + 63$

$= 69 - 6\sqrt{42}$

(f) $\frac{\sqrt{2}}{\sqrt{8} - \sqrt{2}} \times \frac{\sqrt{8} + \sqrt{2}}{\sqrt{8} + \sqrt{2}}$

$= \frac{\sqrt{16} + \sqrt{4}}{\sqrt{64} + \sqrt{16} - \sqrt{16} - \sqrt{4}}$

$= \frac{4 + 2}{8 - 2} = \frac{6}{6} = 1$

(31) (a) $\frac{x}{2}^{\times 42} - \frac{1}{7}^{\times 42}(x+1) = \frac{1}{3}^{\times 42}(2x-6)$

$21x + 6(x+1) = 14(2x-6)$

$21x + 6x + 6 = 28x - 84$

$27x + 6 = 28x - 84$

$90 = x$

(b) $\frac{x+3}{x-5} = \frac{x-6}{x-8}$

$(x+3)(x-8) = (x-6)(x-5)$

$x^2 - 8x + 3x - 24 = x^2 - 6x - 5x + 30$

$-5x - 24 = -11x + 30$

$6x = 54$

$x = 9$

(c) $\left(\sqrt{3x-2}\right)^2 = (x+4)^2$

$3x - 2 = x^2 + 4x + 4x + 16$

$0 = x^2 + 11x + 18$

$x \quad 18 \quad 9\ 3$
$x \quad 1\ 2\ 6$

$0 = (x+9)(x+2)$

$x = 9$ or $x = 2$

(d) $\left(\sqrt{2x-1} + \sqrt{x+11}\right)^2 = (7)^2$

$\left(\sqrt{2x-1}\right)^2 + 2\sqrt{2x-1}\sqrt{x+11} + \left(\sqrt{x+11}\right)^2 = 49$

$2x - 1 + 2\sqrt{2x^2 + 22x - x - 11} + x + 11 = 49$

$\left(2\sqrt{2x^2 + 21x - 11}\right)^2 = (39 - 3x)^2$

$4(2x^2 + 21x - 11) = 1521 - 117x - 117x + 9x^2$

$0 = x^2 - 318x + 1565$

$x = \frac{318 \pm \sqrt{318^2 - 4(1)(1565)}}{2}$ doesn't work if check

$x = \frac{318 \pm 308}{2}$ $x = \cancel{313}$ or $x = 5$

(e) $12 - 6x \leq -4x - 8$

$-2x \leq -20$

$x \geq 10$

(f) $6m^2 + 3m^2 + 3 > 9m^2 + 6m + 1 + 2$

$9m^2 + 3 > 9m^2 + 6m + 3$

$0 > 6m$

$0 > m$