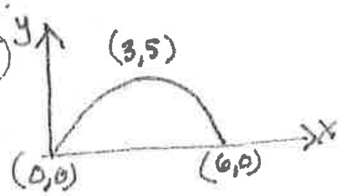
(26) a) $(2x)^4$
$= 2^2x^4$
$= \underline{16x^4}$

b) $(-5xy^2)^3$
$= (-5)^3x^3(y^2)^3$
$= \underline{-125x^3y^6}$

c) $\dfrac{4x^{512}}{x^{502}}$
$= \underline{4x^{10}}$

d) $(6x^4y^{12})(2x^2y^5)$
$= \underline{12x^6y^{17}}$

(25)



$y = a(x-3)^2+5$
Use (6,0) to help find "a"

$0 = a(6-3)^2+5 \longrightarrow 0 = 9a+5 \longrightarrow 9a=-5 \quad a = -\frac{5}{9}$

$\underline{y = -\frac{5}{9}(x-3)^2+5}$

(27) $\left[\left(\frac{1}{4}\right)^{\frac{1}{2}}\right]^{-2} \rightarrow \left[\left(\frac{1}{4}\right)^{-1}\right] \rightarrow \left(\frac{4}{1}\right)^1 \rightarrow \underline{4}$

(28) a) $\dfrac{1}{(2x)^{-2}} = \dfrac{(2x)^2}{1} = 4x^2$ yes

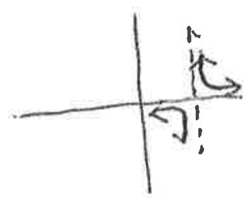
b) $\dfrac{1}{2x^{-2}} = \dfrac{x^2}{2}$ NO

c) $\sqrt{16x^4} = \sqrt{16}\cdot\sqrt{x^4} = 4x^2$ yes

d) $\dfrac{\cancel{12}^{4}\cancel{x^5}x^2}{\cancel{3}_1\cancel{x^3}_1} = \underline{4x^2}$ yes

e) $\dfrac{-2}{(2x^2)^{-1}} = \dfrac{-2(2x^2)^1}{1} = -2\cdot2\cdot x^2$
$= -4x^2$ NO

(29) $f(x) = \dfrac{2}{x-3}$



domain
$-\infty < x < \infty, \; x \neq 3$

range
$-\infty < y < \infty, \; y \neq 0$

asymptote equations
Vertical $x=3$
horizontal $y=0$

(30) x-intercepts of
$3x+5y=18$
$3x+5(0)=18$
$3x=18$
$x=6$
$(6,0)$

y-intercept
$3(0)+5y=18$
$5y=18$
$y=18/5$

$\left(0, \frac{18}{5}\right)$ or $(0, 3.6)$

$y = 2x^2 - 5x - 12$

(31) method 1: to find x-intercepts

$2x^2 - 5x - 12 = 0$

$(2x+3)(x-4) = 0$

$2x+3=0$

$x = -1.5 \qquad x = 4$

$(-1.5, 0)$ and $(4, 0)$

method 2: use the quadratic formula

$a=2 \quad b=-5 \quad c=-12$

$$X = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-12)}}{2(2)}$$

$$X = \frac{5 \pm \sqrt{121}}{4} = \frac{5 \pm 11}{4}$$

$$x = \frac{5+11}{4} = \frac{16}{4} = 4 \qquad x = \frac{5-11}{4} = \frac{-6}{4} = -1.5$$

same!!

---

(32) x-intercept (set $y=0$) $\longrightarrow$ $\sqrt{x+5} = 0$ square both sides

$x+5=0$

$x=-5$

$(-5, 0)$

y-intercept (set $x=0$)

$g(x) = \sqrt{x+5}$

y-int

$y = \sqrt{0+5}$

$= \sqrt{5}$

$(0, \sqrt{5})$

---

(33) the center of the circle changes from $(0,0)$ to $(7,-3)$

the radius changes from 4 to 6

---

(34) New vertex is $(-3,-5)$ so the transformed equation is $y = (x+3)^2 - 5$

---

(35) $4(x-3)^2 + 5 = y$

$\quad -5 \quad -5$

$4(x-3)^2 = y - 5$

$(y-3)^2 = \frac{y-5}{4}$

square root both sides

$y - 3 = \pm\sqrt{\frac{y-5}{4}}$

$y = \pm\sqrt{\frac{y-5}{4}}$

which is two functions!

36a $x - 3(y+2) = 6$

$-x \qquad -x$

$-3(y+2) = 6-x$

divide by -3

$y+2 = \frac{6}{-3} - \frac{x}{-3}$

$y+2 = -2 + \frac{1}{3}x$

$y = \frac{1}{3}x - 4$

36b $\frac{6x-1}{y} - 3 = 2$

$\frac{6x-1}{y} = 5$

multiply by y

$6x-1 = 5y$

$y = \frac{6x-1}{5}$ or $\frac{6}{5}x - \frac{1}{5}$

36c $x^2 + (y-3)^2 = 4$

$(y-3)^2 = 4-x^2$

$y-3 = \pm\sqrt{4-x^2}$

$y = \pm\sqrt{4-x^2} + 3$

37 $y = \sqrt{\frac{1}{2}x} + 5$

$-5 \qquad -5$

$\sqrt{\frac{1}{2}x} = y-5$ square both sides

$\frac{1}{2}x = (y-5)^2$ multiply by 2

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

38a $\frac{\cancel{4}}{\cancel{x^2}} \cdot \frac{\cancel{x^2}y}{8x^3} \cdot \frac{\cancel{x^2}\cancel{y^2}}{\cancel{4x^2y^2}} = \boxed{\frac{y}{8x^3}}$

2 is common

38b $\frac{2a+6}{a^3} \div \frac{a+3}{a} = \frac{2\cancel{(a+3)}}{\cancel{a^3}\,a^2} \cdot \frac{\cancel{a}}{\cancel{a+3}}$

$= \boxed{\frac{2}{a^2}}$

38c $\frac{x^2-4x+3}{x^2-9} \div \frac{6x^2-x-2}{x^2-4x-21}$

lots of factoring should help

$\frac{\cancel{(x-3)}(x-1)}{(x+3)\cancel{(x-3)}} \div \frac{(3x-2)(2x+1)}{(x-7)(x+3)}$

$\frac{(x-1)}{\cancel{x+3}} \cdot \frac{(x-7)\cancel{(x+3)}}{(3x-2)(2x+1)}$

$\boxed{\frac{(x-1)(x-7)}{(3x-2)(2x+1)}}$

$\boxed{39a}$ $\frac{3}{x} + \frac{4}{5} \Longrightarrow \frac{3(5)}{x(5)} + \frac{4(x)}{5(x)} \Longrightarrow \frac{15+4x}{5x}$

the common denominator will be $5 \cdot x$

condense to a sigle fraction

$\frac{4x+15}{5x}$ answer

$\boxed{39b}$ $\frac{x-2}{x+5} - \frac{x-4}{x-3}$

$(x+5)(x-3)$ is the common denom.

$\frac{(x-2)(x-3)}{(x+5)(x-3)} - \frac{(x-4)(x+5)}{(x-3)(x+5)}$

$\frac{(x-2)(x-3) - (x-4)(x+5)}{(x+5)(x-3)}$

$\Downarrow$

$\frac{x^2-3x-2x+6 - (x^2+5x-4x-20)}{(x+5)(x-3)}$

$\frac{\cancel{x^2} - 5x + 6 - \cancel{x^2} - x + 20}{(x+5)(x-3)}$

$\boxed{\frac{-6x+26}{(x+5)(x-3)}}$

$\boxed{40a}$

$\frac{3}{x} + \frac{4}{5} + \frac{2}{x} + \frac{1}{6}$

$30 \cdot x$ will be the common denominator

$\frac{3(30)}{x(30)} + \frac{4(6x)}{5(6x)} + \frac{2(30)}{x(30)} + \frac{1(5x)}{6(5x)}$

$\frac{90 + 24x + 60 + 5x}{30x}$

$= \boxed{\frac{29x+150}{30x}}$

40a $\frac{4-x}{5} + 2 = \frac{x+1}{3}$

multiply all by 15

$\cancel{15}^{3}\left(\frac{4-x}{\cancel{5}_{1}}\right) + 15(2) = \frac{\cancel{15}^{5}(x+1)}{\cancel{3}_{1}}$

$3(4-x) + 30 = 5(x+1)$

$12 - 3x + 30 = 5x + 5$
$+3x \qquad\qquad +3x$

$42 = 8x + 5$

$8x = 37$

$x = \frac{37}{8}$

40b $|2x-7| = 12$

$2x - 7 = 12$

$2x = 19$

$x = 9.5$

$2x - 7 = -12$
$+7 \quad +7$

$2x = -5$

$x = -2.5$

40c $\sqrt{5-x} = 2x$
square both sides

$5 - x = 4x^2$

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

$a = 4 \quad b = 1 \quad c = -5$

Quadr. formula

$x = \frac{-(1) \pm \sqrt{(1)^2 - 4(4)(-5)}}{2(4)}$

$x = \frac{-1 \pm \sqrt{81}}{8} = \frac{-1 \pm 9}{8}$

$x = \begin{cases} \frac{-1+9}{8} = 1 \\ \frac{-1-9}{8} = \frac{-10}{8} = -5/4 \end{cases}$

40d $12 - \left[\frac{2x}{3} + x\right] = 2$
$-12 \qquad\qquad -12$

subtract 12 then multiply by -1

$-\left[\frac{2x}{3} + x\right] = -10$

$\frac{2x}{3} + x = 10$

multiply by 3 to remove fractions

$2x + 3x = 30$

$5x = 30$

$x = 6$

41a $2x - 4 \le 12$

find the boundary points by solving

$2x - 4 = 12$

$2x = 16$

$x = 8$

TEST A point above or below

I'll test $x = 0$

$2(0) - 4 \le 12$

$-4 \le 12$

true

$\boxed{x \le 8}$

41b $|x - 5| > 13$

$|x - 5| = 13$

$x - 5 = 13$ $\quad$ $x - 5 = -13$

$ \quad +5 \quad +5$

$x = 18$ $\quad$ $x = -8$

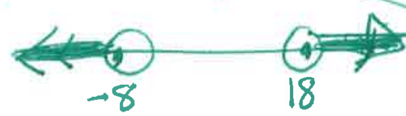
therefore boundary points are 18 and -8

I'll test a point between them, $x = 0$

$|0 - 5| > 13$

$5 > 13$

false



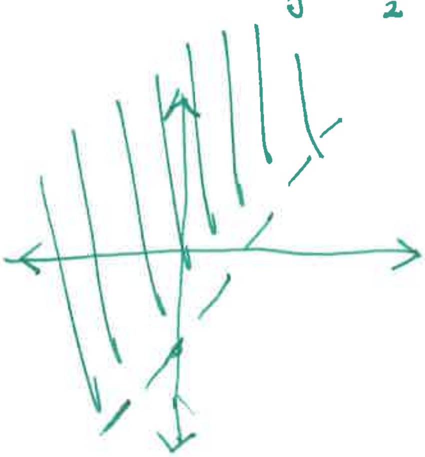
$x < -8$ or $x > 18$

42a boundary equation for $5x - 2y < 10$

is $5x - 2y = 10$

$-2y = -5x + 10$

$y = \frac{5}{2}x - 5$



I'll test $(0,0)$ $\quad$ $5(0) - 2(0) < 10$

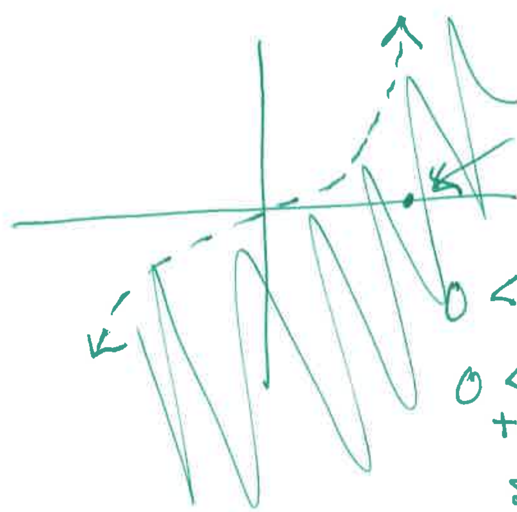
$0 < 10$

true

so shade above

42b $y < 0.05x^3$

boundary equation is $y = .05x^3$



I'll test $(10, 0)$

$0 < .05(10)^3$

$0 < 50$

true

so shade below