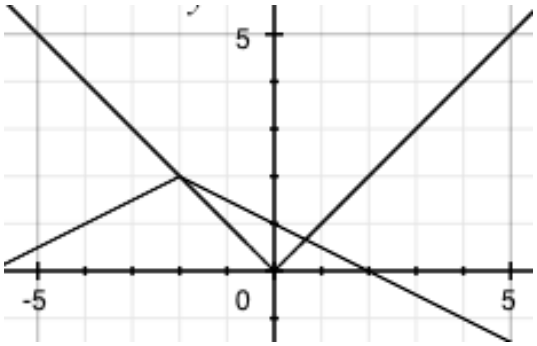
Pre-Calculus 12 Final Exam Review Answers

TRANSFORMATIONS

1. Reflection through *x*- and *y*-axes, vertical expansion about *y*-axis of factor 2, horizontal compression about *x*-axis by factor 1/4, followed by horizontal translation 1/2 unit right and vertical translation 3 units up.

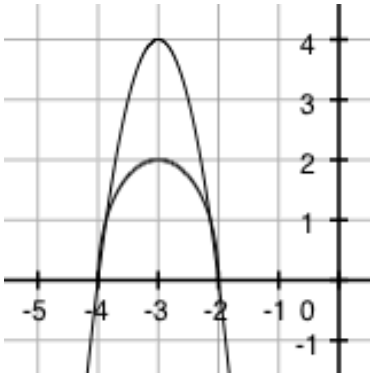
2. $f^{-1}(x)=\dfrac{2}{3x-1}$. Yes. 3. (–1.5, 3) 4.



5. a) $y=-|x|+3$
   b) $y=|x|-5$
   c) $y=-|x-4|+3$

RADICAL & POLYNOMIAL FUNCTIONS

1.

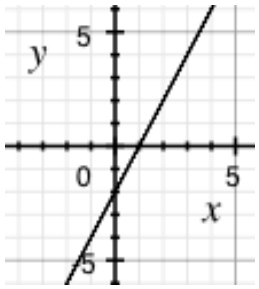


2. $(x, y)\rightarrow(x-2,-\sqrt{-y}+1)$
3. $h(x)=-(x+1)^2(x-3)$
4. –25, 15
5. one possible answer: $y=(x+1)^4(x-1)^2(x-2)$

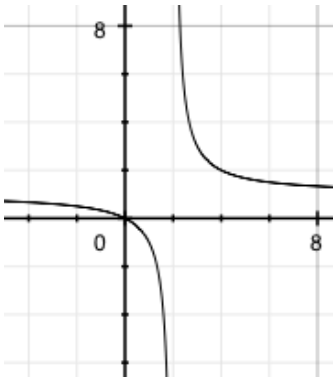
RATIONAL & COMPOSITE FUNCTIONS

1. a) 0 b) $y=\dfrac{x}{x-2}$, $x\neq 1$; asymptotes $x = 2$, $y = 1$; *x*-int 0; *y*-int 0; point of discontinuity (1, –1)

c)



2.



Graph doesn't show point of discontinuity at (1,–1)

vertical asymptote: $x=2$
horizontal asymptote: $y=1$

3. $x=\dfrac{9}{5}$

4. $y=\dfrac{1}{1-2x}$, $x\neq 0$; D={*x*|*x*≠0, *x*≠0.5, *x*∈**R**}, R={*y*|*y*≠0, y≠1, *y*∈**R**}

5. $M(x)=\dfrac{0.01x+6.5}{x+200}$

TRIGONOMETRY

1. $-\cos x$
2. $y = 3\cos\pi(x-3)+3$
3. $\frac{16}{\pi}$ rad, 8 cm
4. $x = \frac{\pi}{2} + \pi n,\ n \in I,\ x = \frac{7\pi}{6} + 2\pi n,\ n \in I,\ x = \frac{11\pi}{6} + 2\pi n,\ n \in I$
5. a) LS = $(\sin x + \cos x)^2 - \sin 2x$

= $(\sin^2 x + 2\sin x\cos x + \cos^2 x) - 2\sin x\cos x$

= $(\sin^2 x + \cos^2 x) + 2\sin x\cos x - 2\sin x\cos x$

= (1) + 0

= 1

= RS

b) LS = $\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}$

= $\frac{(\cos\theta + \sin\theta)(\cos\theta + \sin\theta)}{(\cos\theta - \sin\theta)(\cos\theta + \sin\theta)}$

= $\frac{\cos^2\theta + 2\sin\theta\cos\theta + \sin^2\theta}{\cos^2\theta - \sin^2\theta}$

= $\frac{(\sin^2\theta + \cos^2\theta) + 2\sin\theta\cos\theta}{\cos 2\theta}$

= $\frac{1 + \sin 2\theta}{\cos 2\theta}$

= RS

EXPONENTS AND LOGARITHMS

1. $\log_2 \frac{8\sqrt{a}}{b^3}$
2. 9.2
3. a) Reflection through *x*- and *y*-axes, followed by horizontal translation 2 units right and vertical translation 3 units up.
   b) Reflection through *y*-axes, vertical expansion about *y*-axis of factor 2, horizontal expansion about *x*-axis by factor 5, followed by vertical translation 1 unit up.
4. no solution
5. $P(t) = P_0(0.5)^{\frac{t}{12}}$, 80 s

COMBINATORICS

1. 24
2. 1 645 020
3. 25 290
4. $326\,592\,x^{10}$
5. 3944