PC 12 LG17 Answer Keys (Jan. 2020)

16-11-13-5-10-2-15-18-13-23-8-11-17-11-12-22-11-12-19

Key:

A = $\sqrt{121}$
B = 2^3
C = $\sin\frac{\pi}{2}$
D = $51 \div 3$
E = $\sqrt[3]{1000}$
F = $\frac{1}{2}\left(\frac{1}{2}\left(\frac{1}{2}(16)\right)\right)$
G = $\frac{5}{3}+\frac{5}{3}+\frac{5}{3}$
H = $4205-4186$
I = $\sqrt{13}\times\sqrt{13}$
J = $\frac{14}{5}\times\frac{10}{4}$
K = $|-26|$
L = $(9x+9x)\div 3x$
M = $(9\times11)-(7\times11)$
N = $\sqrt{400}$
O = $1+2+3+4+5$
P = $4^{\sqrt{4}}$
Q = $\int_0^2 9x^2dx$
R = $\frac{4\pi+5\pi}{\pi}$
S = $(5\times2\times2)+3$
T = $\sqrt{144}$
U = $-3\cos\pi$
V = $5^4\div5^2$
W = $2^{(5-3)}$
X = $9216\div512$
Y = $\sqrt{49}\times\sqrt{9}$
Z = $\frac{14\cdot14\cdot14}{14\cdot14}$

	3+4	$(\frac{1}{3})^{-1}$		3^2			$\sqrt{16}$	
$\sqrt{81}$			0100		$\frac{d}{dx}3x$			$3\int_1^2 x^2dx$
			3!					2^3
	2^2					$\frac{24}{8}$	$\sum_{k=1}^{3}k$	
$\frac{252}{36}$								$\log_{10}(10)$
	$\sqrt{4}$	74-65					0101	
$\sqrt[12]{13^4}$					$-(i^2)$			
0110			FF-F8		$\sqrt{64}$			$\frac{5}{4}!$
	$\sqrt[3]{27}$			$\sqrt[3]{64}$		$\sin\frac{\pi}{2}$	$\sqrt{49}$	

LG 1/2 Transformations

1) a) **(3, -1)**

b) **(-3, 1)**

c) **(3, 1)**

d) **(-4, -5)**

e) **(-1, -3)**

2) a) **(c, 3d–4)**

b) **($\frac{-1}{3}$c, d–1)**

c) **($\frac{1}{6}$c–2, 4d–7)**

d) **($\frac{-1}{4}$c+2, -2d–6)**

e) **($\frac{1}{2}$c+5, -3d+4)**

f) **($\frac{-1}{8}$c+1, $\frac{1}{2}$d-3)**

3) a) $f(x) = -5x^3 + 6x^2 - 2$

b) $f(x) = -5x^3 - 6x^2 + 2$

c) $f(x) = 135x^3 - 54x^2 + 2$

4) a) $f^{-1}(x) = \dfrac{-5x}{x+3}$

b) $f^{-1}(x) = \dfrac{(x-2)^2 + 1}{3}$

c) $f^{-1}(x) = \pm\sqrt{\dfrac{x+4}{3}} - 2$

LG 1/2 Transformations

5) **reflect in x-axis**

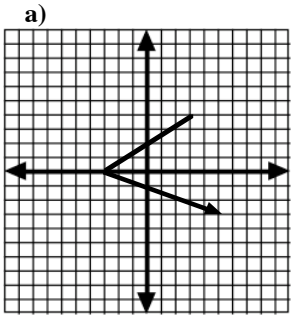
vert. exp. by 2

translate down 5

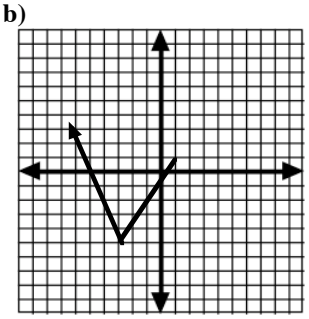
horiz. comp by $\frac{1}{4}$

translate right 3

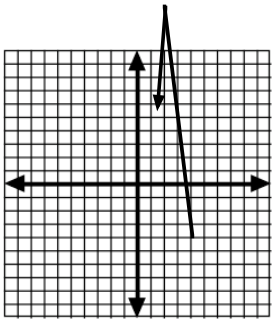
6) a)



b)



c)



d)

7) a) $3f(x-1) - 4 = 3(x-1)^2 - 1$

8) **Domain:** $x \le -7$
Range: $y > 15$

LG 1/2 Transformations

9) $y = f\big(2(x-5)\big) - 2$

10) **x-intercepts: (-2, 0) & (3, 0)**

y-intercept: (0, 24)

11) **a)** $\frac{5}{2}$

b) **i)** **(6, 10)**

ii) **(8, 23)**

iii) **(-8, -9)**

12) **Domain:** $x \geq 4$ **or** $x \leq -4$

13) **Invariant: (5, 5) & (9, 9)**

LG 3 Polynomial Functions

1. a) D b) A c) C d) B

2. **a)** **(-3, 0), (1, 0), (4, 0)**
b) **(0, 12)**

c) **3rd degree**

d) **down into QIII**
up into QI

e) $-3 < x < 1$ *and* $x > 4$

f) $x < -3$ *and* $1 < x < 4$

3. 18

4. -18

5. $k = -1$

6a. $k = -7$ **6b.** $k = -2$

7. $x + 1,\ x - 2,\ x + 3$

8. $(x+2)(x-1)(3x-1)$

9. $(x+3)(x-2)(x-5)$

LG 3 Polynomial Functions

10a. $y = -2(x+2)(x-1)^2$

10b. $y = \frac{-1}{2}(x+3)(x+1)^2(x-2)$

11. $y = 2(x+2)(x+1)(x-3)^2$

12. $y = 5(x-1)(x+2)(x+4)^2$

13. $y = 4\big(-(x-8)\big)^3 - 4$

14. 4, negative

LG 4/5 Exponents & Logs

1) **a)** **7**

a) $\frac{1}{8}$

2) **2.4 hours**

3) **5.09 minutes**

4) **a)** $\log_m k = \frac{p}{q}$

b) $b = y^x$

c) $\frac{\log_6 7}{\log_6 9}$

d) **i)** $\frac{1}{9}$ **ii) 8** **iii) 6**

iv) $x = 0, 1$ **v)** $x = 4$

5) $\log \frac{\sqrt{B}E^5}{C^3\sqrt[4]{D}}$

6) **a)** $\frac{2\log 6 - \log 4}{\log 6}$

b) $\frac{-\log 5 - 3\log 8}{\log 5 - 2\log 8}$

LG 4/5 Exponents & Logs

7) a) **9, reject -3**

b) **-2, reject 3**

c) **1, reject -5**

8) a) **y-intercept: (0, 50)**

b) **eq. horiz. asymp: y = -4**

c) **Domain:** $x \in R$

d) **Range:** $y > -4$

9) a) $2x + 2y$

b) $3 + \frac{1}{2}x$

c) $\frac{3}{2}x$

10) **19.95**

11) a) $m(t) = 200\left(\frac{1}{2}\right)^{t/138}$ **b)** 0.021 g **c)** 552 days

12) a) $y = 5^x + 2$

b) $y = \frac{\log_5 x - 3}{2}$

13) a) $5\log_5 x + 2\log_5 y - 3\log_5 m - \frac{1}{2}\log_5 z$

b) $\log x^{\frac{1}{2}}, x > 0$

14) a) $\frac{k}{m}$

b) **k**

c) **2.5**

15) a) **-1**

b) $\frac{243}{32}$

LG 6 Geometric Sequences & Series

1. a) **508** **b)** $\frac{1}{7}$ **c)** $\frac{11718}{25}$ **d)** $\frac{-61}{27}$

2. $t_1 = 1$

3. a) $\frac{1}{5} + \frac{1}{25} + \frac{1}{125} + \frac{1}{625} + \frac{1}{3125} + \frac{1}{15625}$

b) $\frac{4}{5} + \frac{5}{6} + \frac{6}{7} + \frac{7}{8} + \frac{8}{9}$

4. a) $\frac{959}{60}$ **b)** **25**

5. a) $\sum_{n=1}^{6} 4\left(\frac{1}{2}\right)^{n-1}$ **b)** $\sum_{n=0}^{3} 3n$ **c)** $\sum_{n=1}^{5} \frac{n}{n+1}$ **d)** $\sum_{n=1}^{4} \frac{1}{7-2n}$

LG 7/8 Function Operations & Rationals

1) $(f+g)(x) = \frac{1}{x-1} + \sqrt{x}$

D: $x > 0, x \neq 1$

R: $y \in R$

2) $\frac{g(x)}{h(x)} = x - 4$

D: $x \neq -4$

R: $y \neq -8$

3) $(f \cdot g)(x) = \frac{1}{x(x+1)}$

D: $x \neq 0, x \neq 1$

R: $y > 0$ *or* $y \leq -4$

4) $\left(\frac{f}{h}\right)(x) = \frac{2}{(x-2)}$

D: $x \neq -3, x \neq 2$

R: $y \neq \frac{-2}{5}$ *or* $y \neq 0$

LG 7/8 Function Operations & Rationals

5) a) 5

b) $\frac{-2}{9}$

c) 25

d) 17

e) 7

6) $f\left(g\left(x\right)\right) = \frac{2}{\sqrt{x}}$

D: $x > 0$

R: $y > 0$

7) a) 32

b) $32x^2$

c) $8x^2$

No restrictions

8) a) $g\left(f\left(x\right)\right) = \left|6 - x\right|$

D: $x \in R$

R: $y \geq 0$

b) $g\left(f\left(x\right)\right) = \sqrt{x^4}$

D: $x \in R$

R: $y \geq 0$

9) a) True

b) True

c) False

d) False

LG 10/11 Trigonometric Ratios

1) a) $\frac{7\pi}{9}$

b) 126°

c) $\frac{-6\pi}{7}, \frac{22\pi}{7}$**, ref. angle** $\frac{\pi}{7}$

d) $\frac{-3\pi}{11} + 2n\pi,\ n \in I$

e) $\frac{-23\pi}{6}, \frac{\pi}{6}$

2) a) $\frac{-2}{\sqrt{3}}$

b) undefined

c) $\frac{-2}{\sqrt{3}}$

3) a) -1

b) $\frac{-8}{3\sqrt{3}}$

c) 0

d) $-2\sqrt{3} - 6\sqrt{2}$

4) a) $\pm\frac{5}{\sqrt{21}}$

b) $\frac{3}{2\sqrt{2}}$

c) $\sqrt{15}$

d) $\frac{-1}{2\sqrt{6}}$

5) 2.4

LG 12/13 Trigonometric Graphs

1) **a)** **6**

b) **120°,** $\frac{2\pi}{3}$

c) **-5**

d) $\frac{\pi}{12}$ **to the right**

e) **Domain:** $x \in R$

Range: $-11 \le y \le 1$

2) **a)** **180°, π**

b) **(0, 0)**

c) **-2π, -π, 0**

d) $x = \frac{\pi}{2}$

e) **Domain:** $x \in R,\ x \neq \frac{\pi}{2} + n\pi,\ n \in I$

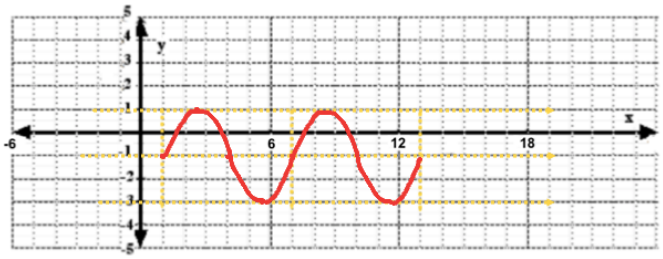
Range: $y \in R$

3) $y = 3\sin\frac{\pi}{3}\left(x + \frac{2\pi}{7}\right) + 8$

4) $y = 4\sin\frac{1}{12}(x - 14\pi) + 4$

$y = -4\cos\frac{1}{12}(x - 8\pi) + 4$

5)



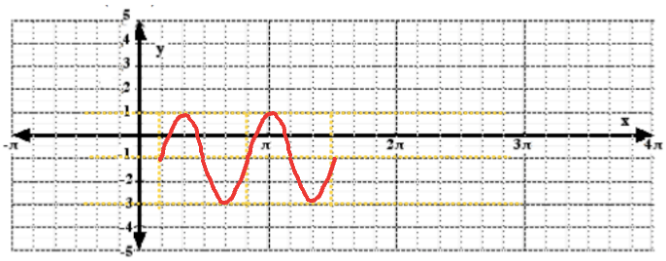
LG 12/13 Trigonometric Graphs

6) $y = -6\sin\frac{\pi}{8}(x - 6) + 0$

7) **a)** $h = -30\cos\frac{\pi}{40}t + 34$

b) **26.18 seconds**

8.



LG 14/15 Trig. Proofs, Sum & Diff & 2A

1) **a)** $3\sin 40^\circ$

b) $-\cos\frac{5\pi}{2}$

c) $6\sin 4x$

d) $\cos\frac{10\pi}{7}$

e) $\frac{1}{2}\sin 40x$

f) $4\cos 10x$

g) $-6\cos 12x$

h) $5\cos 20x$

i) $\tan -4x$

j) $\tan 20$

k) $\tan x$

l) $-\cot^2 A$

LG 14/15 Trig. Proofs, Sum & Diff & 2A

2) **a)** $\frac{16}{65}$

b) $\frac{-33}{65}$

c) $\frac{-24}{25}$

d) $\frac{-7}{25}$

3) **a)** $\frac{1-\sqrt{3}}{2\sqrt{2}}$

b) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

4) **Proofs will vary (see teacher)**

LG 16 Trig. Equations

1) **a)** **150˚, 210˚ (+ n360˚,** $n \in I$**)**

b) **30˚, 150˚ (+ n360˚,** $n \in I$**)**

2) **a)** **0 (+ 2nπ,** $n \in I$**)**

b) $\frac{3\pi}{4}, \frac{7\pi}{4}$**, 1.11, 4.25 (+ 2nπ,** $n \in I$**)**

LG 16 Trig. Equations

3) **a)** **1.36, 4.92 (+ 2nπ,** $n \in I$**)**

b) $\frac{\pi}{4}, \frac{5\pi}{4}$**, 2.94, 6.09 (+ 2nπ,** $n \in I$**)**

c) $\frac{7\pi}{6}, \frac{11\pi}{6}$**, 0.34, 2.80 (+ 2nπ,** $n \in I$**)**

d) **0, π, 0.34, 2.80 (+ 2nπ,** $n \in I$**)**

e) $\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}$ **(+ 2nπ,** $n \in I$**)**

f) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$ **(+ 2nπ,** $n \in I$**)**

g) $\frac{\pi}{6}, \frac{5\pi}{6}$ **(+ 2nπ,** $n \in I$**)**

4) **a)** $\frac{7\pi}{6}, \frac{11\pi}{6}$

b) **No solution**

c) $\frac{-\pi}{6}, \frac{-5\pi}{6}$

5) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}$ **(+ 2nπ,** $n \in I$**)**