Solutions for Math 117 Spring 2022 Common Final version A

1.

2 pt	correct slope in linear formula
2 pt	correct intercept term in linear formula
1 pt	correct function value in part (b)
2 pt	correct explanation of function value
2 pt	at least some attempt to solve $f(t) = 5$, may be incorrect
1 pt	correct solution to find week

(a) $f(t) = 41 - 2t$

(b) $f(12) = 17$

(c) Week 18

2.

2 pt	correct variable identified
1 pt	answer correctly identifies meaning of at least one of x value and P value
1 pt	answer correctly identifies meaning of both variables
2 pt	correct units

(a) x

(b) When 30 tickets are bought, the theater will earn $140

(c) dollars per ticket

3.

2 pt	correct evaluation
2 pt	correct evaluation
2 pt	correct domain
2 pt	at least one of the linear functions is represented, but piecewise may be wrong
2 pt	correct piecewise graph

(a) 6

(b) 7

(c) $0 \leq x \leq 12$

(d) (insert graph here)

4.

1 pt	correctly identify input to d^{-1} as distance
1 pt	correctly identify value of d^{-1} as time
1 pt	some computation at least one RoC is evident
2 pt	reference the fact that all rates of change are postive
1 pt	correct conclusion (maybe even without clear supporting reasons)
2 pt	reference the fact that rates of change are increasing
1 pt	correct conclusion (maybe even without clear supporting reasons)

(a) The amount of time after the brakes are first applied it takes for the car to be 100 feet away from the stoplight. Or: The time when the car is 100 feet away from the stoplight.

(b) Decreasing as the d values are getting smaller. The rates of change are all negative

(c) Concave up. The rates of change are getting less negative

5. 4 seconds

3 pt	evidence of correct use of quadratic formula
2 pt	correct evaluation of quadratic formula
1 pt	correctly choose positive root as solution

6. | 2 pt | evidence of applying a correct approach (e.g. complete square, vertex coord. formula) |
    | 2 pt | computations correct |
    | 1 pt | vertex correctly provided with y coordinate |
    | 1 pt | axis of symmetry correctly stated |

Vertex: $(-4, -19)$. Axis of symmetry: $x = -4$

7. | 1 pt | evidence of use of factored form |
    | 2 pt | intercepts correctly used |
    | 2 pt | progress at solving for leading coefficient |
    | 1 pt | all's correct |

$y = -3(x + 1)(x - 2)$

8. | 2 pt | both bounds of domain are correct |
    | 2 pt | both bounds of range are correct |
    | 1 pt | evidence of using vertical stretch or compression |
    | 1 pt | correct value |
    | 1 pt | correct a |
    | 1 pt | correct h |
    | 1 pt | sign expressed correctly for horizontal shift |
    | 1 pt | correct k |

(a) Domain: $-4 \le x \le 7$. Range: $-2 \le f(x) \le 2$

(b) $g(x) = 0.5g(x)$

(c) $j(x) = 2f(x - 4)$

9. | 2 pt | solve for slope |
    | 2 pt | solve for vert. intercept |
    | 2 pt | elements combined into linear expression |
    | 2 pt | solve for power |
    | 2 pt | solve for coefficient |
    | 2 pt | elements combined into a power function expression |

(a) $y = 240x - 448$

(b) $2x^4$

10. | 1 pt | some formula for T as a function of w is given |
    | 1 pt | T is inversely proportional to w |
    | 1 pt | constant k is included correctly |
    | 2 pt | plug in values and progress on solving for k |
    | 1 pt | correct value of k |
    | 1 pt | use formula found in part (b) |
    | 1 pt | plug in given value |
    | 1 pt | evaluate for T correctly |

(a) $T(w) = \dfrac{k}{w}$

(b) $k = 2280$, so $T(w) = \dfrac{2280}{w}$

(c) 95

11.

1 pt	factored form shows up with at least one zero correctly used $\quad y = -(x+1)(x-3)^2$
2 pt	both zeros accounted for in factored form
2 pt	correct parity of multiplicities
1 pt	correct multiplicities

12.

1 pt	correct hole identified
1 pt	no non-holes identified
1 pt	at least one correct asymptote identified
1 pt	both asymptotes correctly identified
2 pt	correct horizontal asymptote
1 pt	set $f(x) = 0$
1 pt	correct solutions
1 pt	set $x = 0$
1 pt	evaluate

(a) $x = 7$

(b) $x = 5, x = -14/3$

(c) $y = 1/3$

(d) $x = 2, x = -4$

(e) $y = 4/35$