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Pure Math 20 Cumulative Review Key

1. $140.50 \times 12 = \$1686/yr.$

$$\frac{\text{assessed value} \times \text{mill rate}}{1000} = \text{tax}$$

$$\frac{x \quad (24)}{1000} = 1686$$

$24x = 1686000$

$x = \$70,250$

(1)

2. $1712 \times 0.9 = \$1540.80$ (Amount financed)

Total payments $145 \times 12 = \$1740$

(2) finance charge $1740 - 1540.80 = \$199.20$

3. Determine interest rate

$12762.80 = 10000(1+i)^5$

$\frac{1.27628}{} = (1+i)^5$

$\sqrt[5]{1.27628} = 1+i$

$i = \sqrt[5]{1.27628} - 1$

$i = 0.05$

(3)

$A = 10000\left(1 + \frac{0.05}{2}\right)^{5\times 2}$

$A = \$12800.85$

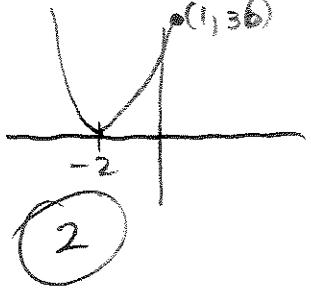
How much more interest earned? $12800.85 - 12762.80$

$\$38.05$

4. $h(t) = -2t^2 + 30t + 2$ (graph)

(1) max height 114.5 m

5.



(2)

$y = a(x+2)^2 + 0$

$36 = a(1+2)^2 + 0$

$36 = 9a$

$a = 4$

$y = 4(x+2)^2$

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

$y = 2(x^2 + 6x + 9 - 9) + 5$ (+3)

(2) $y = 2(x+3)^2 - 18 + 5$

$y = 2(x+3)^2 - 13$

b) $y = 3x^2 - 18x - 19$

$y = 3(x^2 - 6x + 9 - 9) - 19$ (−3)

(2) $y = 3(x-3)^2 - 27 - 19$

$y = 3(x-3)^2 - 46$

7. $y = 2(x^2 + 2.5x + 1.5625) + 10$ (+1.25)

(2) $y = 2(x+1.25)^2 - 3.125 + 10$

$y = 2(x+1.25)^2 + 6.875$

$K = 6.875$

8. a) $y = a(x+7)(x+3)$

$16 = a(0+7)(0+3)$

(1) $16 = 21a$

$a = \frac{16}{21}$

$y = \frac{16}{21}(x^2 + 10x + 21)$

$y = \frac{16}{21}x^2 + \frac{160}{21}x + 16$

b) x intercepts are -7 and -3

(2) y-int at 16

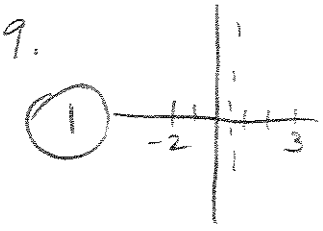
c) D: $x \in R$

R: $y \geq -3.05$

(2) Vertex: $(-5, -3.05)$

axis of sym: $x = -5$

9.



(1)

axis of sym half way between roots.

$x = 0.5$

10. a) $x = \frac{10 \pm \sqrt{10^2 - 4(1)(-15)}}{2(1)}$

(2) $x = \frac{10 \pm \sqrt{160}}{2}$

$x = \frac{10 \pm 4\sqrt{10}}{2}$

$x = 5 \pm 2\sqrt{10}$

b) $x = \frac{-6 \pm \sqrt{6^2 - 4(1)(7)}}{2(1)}$

(2) $x = \frac{-6 \pm \sqrt{8}}{2}$

$x = \frac{-6 \pm 2\sqrt{2}}{2}$

$x = -3 \pm \sqrt{2}$

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10 c) $x = \dfrac{12 \pm \sqrt{12^2 - 4(3)(11)}}{2(3)}$

$x = \dfrac{12 \pm \sqrt{12}}{6}$ (2)

$x = \dfrac{12 \pm 2\sqrt{3}}{6}$

$x = \dfrac{6 \pm \sqrt{3}}{3}$

11. $y = a\,x(x+2)(x-6)$

$-16 = a(2)(2+2)(2-6)$

$-16 = a(2)(4)(-4)$

$-16 = -32a$ (2)

$a = +\frac{1}{2}$

$y = \frac{1}{2}x^3 + mx^2 - 6x$

$-16 = \frac{1}{2}(2)^3 + m(2)^2 - 6(2)$

$-16 = 4 + 4m - 12$

$-8 = 4m$ (2)

$m = -2$

12. $y = a(x-2)^2 + 8$

$8 = a(0-2)^2 + 8$

$-8 = 4a$ (2)

$a = -2$

13. $y = a\,x(x+2)(x-1)$

$8 = a\,2(2+2)(2-1)$

$8 = 2a(4)(1)$

$8 = 8a$ (2)

$a = 1$

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

14. $f(6x-2) = (6x-2)^2 - 2(6x-2) + 2$

$= 36x^2 - 24x + 4 - 12x + 4 + 2$ (2)

$y = 36x^2 - 36x + 10$

Range: $y \geq 1$ (1)

15. $x^7 + kx - 2$

$(1)^7 + k(1) - 2 = 7$ (2)

$k = 8$

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16. a) $x^3+3x^2 \geq x+3$

$x^3+3x^2-x-3=0$ x-int (-3) (x+3)

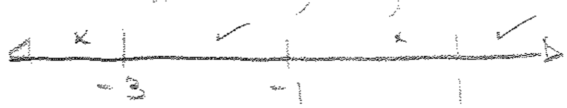
3	1	3	-1	-3
		3	0	-3
	1	0	-1	0

(3)

$(x+3)(x^2-1)=0$

$(x+3)(x+1)(x-1)=0$

$x = -3, -1, 1$



$-3 \leq x \leq 1$

$x \geq 1$

b) $x+3 = x+4$

$3 \neq 4$

(2)

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

$-x-3 = x+4$

$-7 = 2x$

$x = \frac{-7}{2}$

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

$-x-3 = -x-4$

$-3 \neq -4$

c) $x = \sqrt{x+10} + 2$

$x-2 = \sqrt{x+10}$

$x^2-4x+4 = x+10$

$x^2-5x-6=0$

$(x-6)(x+1)=0$

$x=6$ | ~~$x = -1$~~

(2)

17. $5 = |x-2|$

$5 = x-2$

$7 = x$

(2)

$5 = -x+2$

$3 = -x$

$x = -3$

18. i) Graph $y_1 = \sqrt{x} + \sqrt{x-3}$, $y_2 = 5$ } Find points of intersection

(2)

ii) Graph $y_1 = \sqrt{x}$, $y_2 = 5 - \sqrt{x-3}$ } Find points of intersection

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19.

$$3x-2 \overline{) \, 6x^3 - x^2 + 19x + p}$$

Quotient: $2x^2 + x + 7$

$6x^3 - 4x^2$

$3x^2 + 19x$

$3x^2 - 2x$

$21x + p$

$21x - 14$

3

(2)

$p - (-14) = 3$

$p = -11$

20. $y = 6(-4)^3 + 25(-4)^2 + 2(-4) - 8$

$y = 0$

+4	6	25	2	−8
		24	4	−8
	6	1	−2	0

(3)

$(x+4)(6x^2 + x - 2) = 0$

$\frac{4}{6} \quad -\frac{3}{6}$

$\frac{2}{3} \quad -\frac{1}{2}$

$(x+4)(3x+2)(2x-1) = 0$

$x = -4$ | $x = -\frac{2}{3}$ | $x = \frac{1}{2}$

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