

Sample 3201 Exam Long Answer

$$51. \quad 2x - 7 + 1 + 4 + 6x + 1 + 4x + 27 + 2 = 100\%$$

$$12x + 28 = 100$$

$$12x = 72$$

$$x = 6$$

$$\text{all 3} \Rightarrow 6x \\ = 36\%$$

$$36\% \text{ of } 200 \text{ students} = 72 \text{ students}$$

$$52a) \quad \boxed{BB} \underline{GGGG} \Rightarrow 2! \cdot 5! = 240$$

$$b) \quad \frac{n(n-1)(n-2)!}{(n-2)!} = 12$$

$$n(n-1) = 12$$

$$n^2 - n - 12 = 0$$

$$(n-4)(n+3) = 0$$

$$\boxed{n=4} \quad \cancel{n=-3}$$

$$c) \quad {}_{12}P_4 = 11880 \quad \text{or} \quad 12 \cdot 11 \cdot 10 \cdot 9$$

53a) Favourable

$$\underline{4} \underline{3} \underline{2} \underline{1} \overset{\substack{\uparrow \text{odd} \\ 3 \text{ or } 5}}{2} = 48$$

$$\text{Total possible} \Rightarrow 5! = 120$$

$$\text{prob} \Rightarrow \frac{48}{120} = 0.4 = 40\%$$

53b. prob female = $\frac{7}{15}$

prob red marble = $\frac{1}{4}$

prob. male

prob not red

$$\frac{8}{15} \cdot \frac{3}{4} = \frac{24}{60} = 40\%$$

54a) $\frac{(1-x)(1+x)}{8(1-x)} \cdot \frac{2(3x-1)}{3(x+1)} = \frac{2(3x-1)}{24}$

$$= \frac{3x-1}{12}$$

$x \neq 1, \frac{1}{3}, -1$

54b.

Pat	x	$\frac{1}{x}$
Chris	2x	$\frac{1}{2x}$
Both	5	$\frac{1}{5}$

$$\frac{1}{x} + \frac{1}{2x} = \frac{1}{5}$$

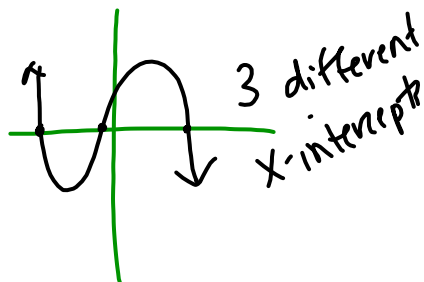
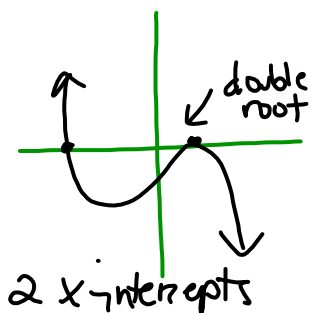
CD: 10x

$$10 + 5 = 2x$$

$$15 = 2x$$

$$7.5 = x$$

55a)



$$55b) \text{ y-int} \Rightarrow (0, 1)$$

$$\text{E.B} \Rightarrow 3 \text{ to } 1$$

$$\text{max intercepts} \Rightarrow 3$$

ii) 3 x intercepts means $x^3 \rightarrow$ cubic

$$56a) 3^{1/2} = (3^3)^{4x+1}$$

$$3^{1/2} = 3^{12x+3}$$

$$\frac{1}{2} = 12x + 3$$

$$-\frac{5}{2} = 12x$$

$$-5 = 24x$$

$$x = -\frac{5}{24}$$

$$56b) i = \frac{0.06}{12} = 0.005$$

$$\#1 \quad A = 5000(1.005)^{36} \leftarrow 3 \text{ yrs} \times 12$$

$$= \$5983.40$$

$$\#2 \quad i = \frac{0.065}{2} = 0.0325$$

$$A = 5000(1.0325)^6$$

$$= 6057.74 \leftarrow \$74.34 \text{ more}$$

$$57a) 5^{x-1} = 8^{x+1}$$

$$x-1(\log 5) = x+1(\log 8)$$

$$x-1(0.6990) = x+1(0.9031)$$

$$0.6990x - 0.6990 = 0.9031x + 0.9031$$

$$0.6990x - .9031x = 0.9031 + 0.6990$$

$$-0.2041x = 1.6021$$

$$x = -7.8$$

$$57b) i) 5 = -\log x$$

$$-5 = \log x$$

$$10^{-5} = x$$

$$\frac{10^{-9}}{10^{-5}} = 10^{-4} = 0.0001 \text{ times}$$

$$ii) 9 = -\log x$$

$$-9 = \log x$$

$$10^{-9} = x$$

$$58a) i) \text{amp} = 2$$

$$\text{period} = 120^\circ$$

$$\text{midline: } y = -1$$

$$\text{range: } R: \{y \mid -3 \leq y \leq 1, y \in \mathbb{R}\}$$

$$ii) y = 2\cos 3x - 1$$

$$59. i = \frac{0.08}{12} = 0.007$$

$$A = 2500(1.007)^{36}$$

$$= 3213.67$$

$$\text{Interest} = 3213.67 - 2500$$

$$= \$713.67$$